USDA

Agriculture

United States
Forest
Service

July 1, 2015

ENVIRONMENTAL ASSESSMENT

DARBY LUMBER LANDS WATERSHED IMPROVEMENT AND TRAVEL MANAGEMENT PROJECT – PHASE I

BITTERROOT NATIONAL FOREST
DARBY RANGER DISTRICT

Table of Contents

List of Tables

List of Figures

Appendix

Appendix C – Elk Habitat Effectiveness Amendment

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

We prepared this Environmental Assessment (EA) to determine whether effects of storing, decommissioning or obliterating excess roads, changing access on specific roads, non-commercially thinning existing aspen stands or creating motorized loop routes by combining existing roads and new connector trails may be significant, and thus, require the preparation of an Environmental Impact Statement. If there are no significant effects determined through this analysis, we will summarize our results in a Finding of No Significant Impact, review public comments, and release a signed Decision Notice authorizing the Darby Ranger District to implement the activities on the Forest. By preparing this EA, we are complying with the National Environmental Policy Act (NEPA) and other relevant Federal and state laws and regulations. For more details of the proposed action, see the "Proposed Action and Alternatives" section of this document in Chapter 2.

1.2 BACKGROUND

1.2.1 HISTORY

The Bitterroot National Forest (BNF) has acquired former private or railroad "checkerboard" lands in the Sleeping Child and Rye Creek drainages. In 2005, eight sections known as the Old Darby Lumber Lands ("DLL") or Rye Creek Lands, east of Darby, Montana were acquired. These sections included 1, 3, 5, 7, 9, 11, 13, and 15 in T. 3 N., R. 19 W., P.M.M. (Figure 1-2). Federal funding for this acquisition came from the Land and Water Conservation Fund (http://www.lwcfcoalition.org/about-lwcf.html), and a cooperative agreement by the Trust for Public Land (a national nonprofit) facilitated the process. The Land and Water Conservation Fund provides land acquisition funding for many conservation goals, including:

- Recreational areas, trails and waterways for paddling, hiking, biking, hunting, fishing, and wildlife watching
- Enhancing access to national parks, forests, wildlife refuges, and other public lands
- Preserving historic battlefields and cultural sites
- Safeguarding rivers, watersheds, water supplies, and clean water
- Conserving working forests, farms, and ranches
- Preserving natural areas and wildlife habitat
- Creating and improving state and local parks
- Supporting local economies and jobs through increased outdoor recreation.

Support for this land acquisition was widespread. Federal acquisition of the DLL sections was supported by the Rocky Mountain Elk Foundation, Ravalli County Commissioners, Grassroots for Multiple Use, Trout Unlimited, Ravalli County Fish and Wildlife Association, Montana Fish, Wildlife & Parks, Friends of the Bitterroot, League of Women Voters, Trust for Public Lands, and the Montana Wilderness Association. The land acquisition was for conservation purposes. From the Trust for Public Land Press Release (PF-History-004): "The lands have significant wildlife and fisheries values as well as a long tradition of public access to the adjacent National Forest lands." Project File documents PF-History-001 through 003 provide more background information on this acquisition.

The BNF acquired several more former DLL sections in 2013 (section 23, T. 3 N., R. 19 W. and portion of section 3 and all of section 11, T. 3 N., R. 20 W., P.M.M.) in trade for lands that adjoin the CB Ranch. Most of section 23 is located within the Phase I boundary and is included in this proposal.

Approximately 9 sections of the acquired lands are now included in the Phase I project area, along with interspersed sections that have been administered by the Bitterroot National Forest since its origin (Figure 1-2). All other acquired lands (mostly those west of the Phase I project boundary) and interspersed original National Forest Sections will be reviewed at a later date during Phase II of the project. Phase II would review the area including Little Sleeping Child to Robbins Gulch, between the Phase I western boundary and private lands.

Darby Lumber Company ("DLC") and other former owners managed these private "checkerboard lands" (alternating private sections within public lands) for economic (timber) values. DLC constructed roads for the purpose of timber removal, and did not store or maintain the roads prior to going out of business. Without maintenance, many stream crossings and sediment-reduction measures have failed since their initial construction. Road conditions, crossings and drainage features have deteriorated and now negatively affect soil, watershed and fisheries values due to accelerated erosion (Figure 1-1).

Figure 1- 1: View of failed road/stream crossing. Culvert became blocked and the road washed out. This washout continues to erode, creating a chronic sediment source for Upper Sleeping Child Creek.

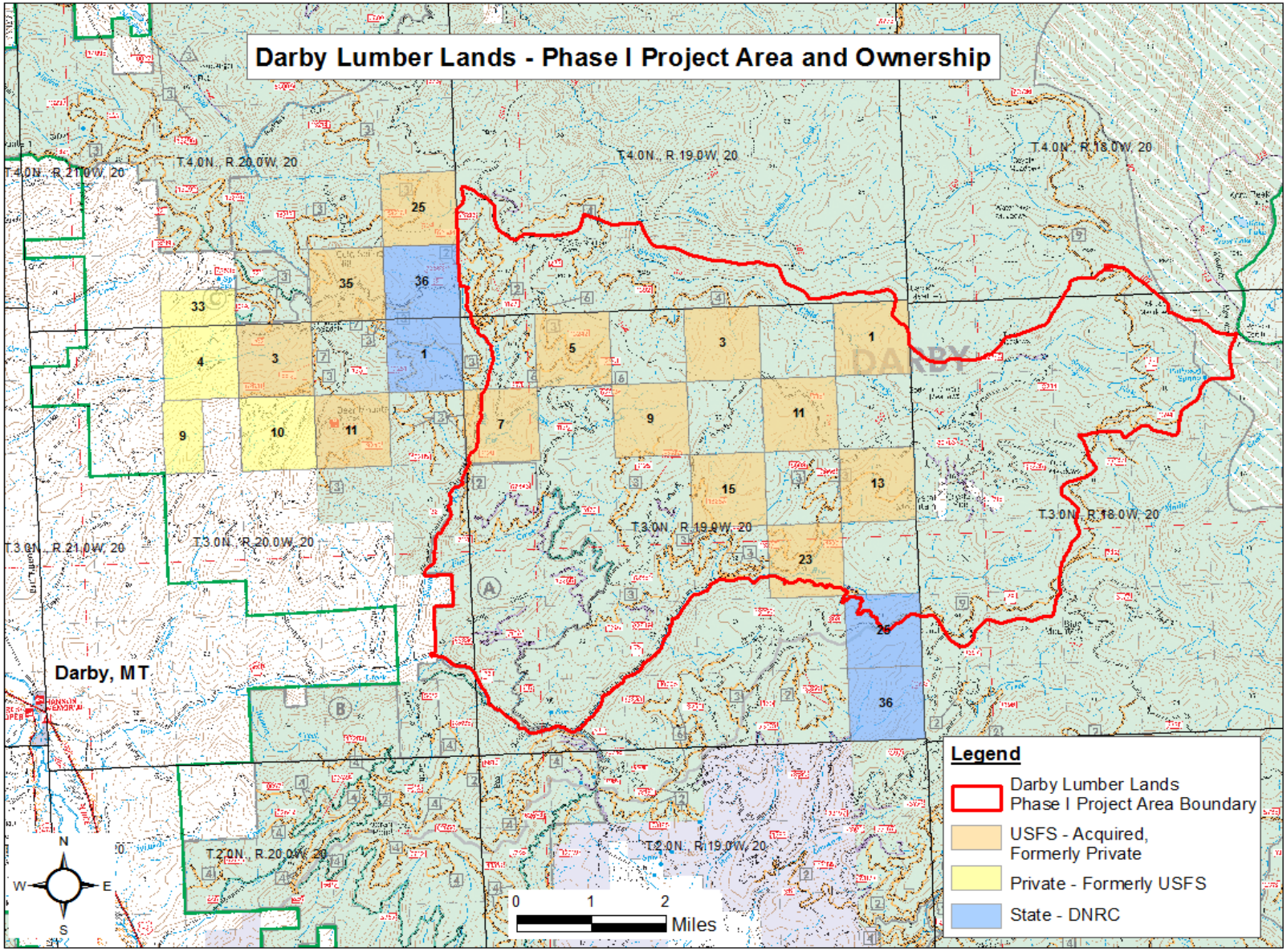

Figure 1- 2: Darby Lumber Lands Phase I Project Area and Land Acquisition Changes. Sections 1, 3, 5, 7, 9, 11, 13, 15, and 23 of T. 3 N., R. 19 W., P.M.M. were formerly owned and managed by the Darby Lumber Company. Acquired sections west of the Phase I project boundary will be assessed later in Phase II of the project.

Figure 1- 3: View of post fire landscape in Upper Sleeping Child watershed. The combination of reduced ground cover, high fire severity impacts, and coarse granitic soils led to increased surface erosion across landscapes in the Darby Lumber Lands project area. Soil and vegetation conditions are on an improving trend since the fires of 2000; lodgepole pine has regenerated across many of the high elevation areas.

The 2000 fires adversely affected many of these roads, as chronic sediment sources worsened under the post-fire hydrology. Post-fire hydrology has increased both road and upland sediment contribution by decreasing protective vegetative cover and organic layers in the soil, increasing runoff and surface flows (Figure 1-3). Forest Service observations and MDEQ assessments both point to this degraded and unmaintained road system as a primary sediment source in project area watersheds.

1.3 TRAVEL ANALYSIS PROCESS

The BNF completed a Travel Analysis Process (PF-TRANS-002) prior to proposing large-scale investment or changes in this acquired road system. The TAP considers the environmental setting, area management goals and current condition, determines the benefits and risks of the road system, and makes suggestions for creating a road and trail system that protects resources while providing adequate access to support recreation and resource management goals. The proposed project area where activities and changes are proposed falls within the larger TAP assessment area (PF-TRANS-001).

The TAP process considered existing water quality assessments; public input and staff field observations. Rye and Sleeping Child Creeks are on the 2014 MDEQ 303(d) list of impaired waters (MDEQ 2014). Both creeks only partially support cold-water fishery and aquatic life beneficial uses due, in part, to sedimentation/siltation attributed to native-surface roads. In accordance with the Clean Water Act, the Montana Department of Environmental Quality (MDEQ) has completed the Total Maximum Daily Load ("TMDL", MDEQ 2011) water quality assessment for Rye and Sleeping Child Creeks and the downstream Bitterroot River. TMDLs are assessments of polluted waters that determine the pollutant reduction needed to achieve state-assigned beneficial uses for the lake or stream in question. The 2011 MDEQ Bitterroot

River TMDL watershed assessment specifically supports sediment-reducing watershed improvement work in Rye and Sleeping Child Creeks to improve beneficial use achievement. A Memorandum of Understanding ("MOU") between the Forest Service and Montana requires the Forest Service to achieve pertinent water quality standards on those lands it administers.

The TAP recommends substantial changes in the existing road system, many of which would help achieve the 2011 TMDL goals. Bitterroot National Forest timber staff determined changes in harvest technology have made many closely spaced roads unneeded to meet harvest goals. Many existing roads on both former DLC and original US Forest Service jurisdictions are spaced closely together to support "jammer" logging, a short-reach method considered obsolete due to intensive soil disturbance. Due to past harvest and fire, much of the project area will not provide commercial timber opportunities for over 30 years. This background suggests there are opportunities for decommissioning and storing specific roads to achieve future management and resource protection goals. The TAP results suggest a smaller road network can achieve fire suppression goals. Finally, the TAP results suggest the amount of road (road density) and road condition in the project area conflicts with Forest Plan water quality, fisheries, and wildlife goals.

The Ravalli County Off-Road Users Association ("RCORUA") provided extensive field reviews of the road system in the newly acquired sections. Field reviews included observations on road condition, drainage issues, scenic value and recreational potential.

Lastly, the Bitterroot Restoration Committee ("BRC"), a local collaborative group interested in forest restoration on the BNF, reviewed and provided further input into the TAP and resulting route recommendations. BRC goals follow Montana Forest Restoration Committee guidelines (http://www.montanarestoration.org/principles-overview), which attempt to "accelerate the recovery of ecological processes and to enhance societal and economic well-being."

The final route system proposed in Alternative B considers the TAP recommendations, public comment and specialist analysis for the project. It varies slightly from the original TAP recommendations based on the new information received during the EA process.

1.4 PROPOSED PROJECT AREA

The project proposes changes within the project area boundary shown in Figure 1-2. The project area covers 28,758 acres. It includes a portion of the Forest Service Lands within the upper Sleeping Child, upper Rye Creek and lower Rye Creek 6th-level watersheds, southeast of Darby, Montana.

1.5 NEED FOR THE PROPOSAL

The main purpose of this proposal is to reduce road-related sediment entering streams on National Forest System Lands in the Rye and Sleeping Child Creek drainages and therefore, to bring area streams into compliance with Bitterroot Forest Plan and Montana Department of Environmental Quality (MDEQ) standards, including the 2011 Bitterroot River TMDL. A secondary purpose is to designate several existing roads as part of a sustainable route system for OHV's < 50", along with building several connector trails to form loop routes. A third purpose is to promote the long-term existence of several aspen stands for wildlife habitat.

1.5.1 REDUCING ROAD-RELATED EFFECTS

Roads on the National Forest serve many beneficial uses. Roads provide motorized access for extracting natural resources, recreation, and fire suppression. However, in the decades since the roads were constructed, there have been many changes. Logging system technology now requires fewer miles of road than in the past. There is also more awareness about the adverse environmental effects of roads.

Of all the land management activities that are undertaken, road construction has arguably contributed the most to cumulative degradation of streams (Trombulak and Frissell 2000, US Forest Service 2001). Scientists and others recognize road construction as one of the longest lasting, detrimental, and intrusive activities on the environment. Many scientific studies document the impact of roads. These include increased sediment to streams caused by erosion of road surfaces, disruption of the hydrologic function of watersheds by the interception of surface and subsurface water flows, and mass wasting. There are also many effects on wildlife, including disturbance during breeding and rearing, increased vulnerability of wildlife during hunting season, and poaching.

Research strongly suggests reducing the amount of road that is hydrologically connected to streams reduces fine sediments responsible for degrading aquatic environments (Trombulak and Frissell 2000, PF-AQUATICS-001, USDA 2001). This occurs through the reduction of surface flows brought about by increased infiltration rates and improved vegetation cover on treated roads, along with elimination of specific routing channels such as ruts and ditches.

Upland or terrestrial wildlife and plant communities also tend to benefit from road reduction (Trombulak and Frissell 2000, US Forest Service 2001). Reduced stress, fewer new invasive plant introductions, and reduced hunting pressure are typical benefits.

The MDEQ designation of Sleeping Child and Rye Creeks as sediment impaired (MDEQ 2014, MDEQ 2011) and project-area fieldwork supports the need to reduce road-related sediment. With logging systems requiring reduced road networks and project area history (fire and intensive harvest) reducing timber management opportunities for several decades, there is an opportunity to downsize the road system, improve water quality and achieve state-designated beneficial water uses (e.g., aquatic life).

1.5.2 DESIGNATING RECREATIONAL MOTORIZED ROUTES

The Forest Plan for the Bitterroot National Forest (US Forest Service 1987) designates the majority of the project area as MA-1, which has a timber and multiple-use emphasis. This provides the management basis for keeping a road system that is ecologically sustainable and appropriate for the land-use designation. Both the MA-1 designation and public input suggest recreational motorized use is appropriate for most of the project area. Other Management Area guidelines also support a motorized transportation system. There has been a request for routes open to OHV's < 50" in width (OHVs and Motorcycles), but closed to full-size vehicles, by a local pro-motorized access group (RCORUA). The Ranger determined this was sufficient interest to propose several new routes in the project area.

1.5.3 TREATING ASPEN STANDS

Research suggests aspen occupies a small fraction of its historical area due mainly to fire suppression. Aspen stands benefit wildlife and provide increased landscape diversity and aesthetics. The 2000 fires that affected the project area rejuvenated several aspen stands that are large enough to provide various benefits, but have a minor component of lodge pole pine that will out-compete and dominate the stands within a relatively short time. Non-commercially thinning conifers within two selected aspen stands would increase their longevity and help provide the above benefits for a longer period.

1.6 TIMING

The Forest is proposing to conduct road decommissioning in 2015 because funding is now available to complete the work, and delaying the work only continues the on-going and substantial sediment contributions. Deferring the work until a later date would delay meeting Forest Plan direction and the TMDL standards for at least another year, perhaps longer, depending upon priorities and funding availability.

The Forest is proposing a change in motorized access on specific routes in 2015, along with construction of connector trails beginning in 2015 because the RCORUA has expressed interest in helping fund and build approved connector routes, along with any necessary resource protection improvements to the existing roads used in the loop routes. The motorized recreation community consistently expresses a desire for loop routes. Combining proposed access changes for OHV < 50" in width with other travel system management, detailed above, provides efficient use of Forest staff and a more balanced approach than separating the proposals.

The Forest is making this proposal prior to the Forest-wide Travel Planning project. The Travel Planning Project process has never reviewed the Darby Lumber Lands project area in detail due to the start of this higher-resolution project in 2008. Travel Planning also does not include ground-disturbing activities in its proposal (it only decides motorized access status) and therefore could not remediate the road deterioration issues found in the acquired lands. This project reviews the area in detail, provides specific motorized access designations, proposes decommissioning of roads to meet congressionally assigned targets and takes advantage of partnership and MDEQ funding. It also moves ahead with important restoration work to reduce on-going sediment issues.

The timing for implementing the proposed OHV-related activities (new connector trails and BMP work on existing roads) is dependent on funding, which would likely come from a combination of partnership and National Forest sources.

1.7 PROPOSED ACTION

1.7.1 DECISION TO BE MADE

Based on the effects documented in this EA, the District Ranger will decide to either; proceed with this project; drop the proposal; or, if it appears the environmental effects may be significant, prepare an environmental impact statement. If effects are not significant, the District Ranger will prepare a decision notice and finding of no significant impact (FONSI) documenting the decision to implement the project.

Given the purpose and need, the deciding official reviews the proposed action and the other alternatives in order to make the following decisions:

- Whether the proposed action will proceed as proposed, as modified by an alternative, or not at all;
- What design criteria, mitigation measures, and monitoring requirements apply to the project;
- Whether the project requires a Forest Plan amendment.

1.7.2 PUBLIC INVOLVEMENT

The initial proposal to implement the road and trail system supported by the TAP was introduced to the public on the BNF website, through a project scoping letter (PF-SCOPING-001) and a press release in the local newspaper of record (PF-SCOPING-002). The scoping letter invited the public to comment on the proposal, and specifically, how to improve the project's achievement of a sustainable, long-term transportation system. The BNF received 28 comments, including both specific and general recommendations. The Inter-disciplinary team ("IDT") and District Ranger used these comments to develop issues and to refine the Proposed Action.

1.7.3 ISSUES

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those:

- outside the scope of the proposed action;
- already decided by law, regulation, Forest Plan, or other higher level decision;
- irrelevant to the decision to be made;
- or, conjectural and not supported by scientific or factual evidence.

The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in PF-SCOPING-004 and PF- NEPA-001 Many of these non-significant issues are considered in resource effects discussion in Chapter 3, for the benefit of the deciding official and the public.

The project addresses the relevant issues identified during scoping with the application of design criteria or mitigation measures, and evaluation through the effects analysis. The IDT and Ranger found additional design features, mitigation, environmental assessment or changes to the Proposed Action addressed issues brought up through public and internal comment. Therefore, there are no significant issues and only one action alternative (Alternative B- Final Proposed Action, Chapter 2). Substantial issues that were relevant to the proposal, but not found to be significant are listed below, along with the proposed resolution:

Issue 1: The Final Proposed Action would not meet the 1987 Forest Plan Elk Habitat Effectiveness (EHE) standards

Discussion: The Final Proposed Action (Alternative B) would change motorized access within the project area to a small degree. Several third-order drainages (the spatial unit assigned for the Forest Plan standard) do not meet the EHE standard. The Final Proposed Action would improve that situation but not enough to meet the EHE standard in some third-order drainages.

Response/Indicator to Describe Effects: The Ranger and IDT considered an alternative that would meet the EHE standard, but did not analyze it in detail (Section 2.7). The EA includes an elk herd health assessment including EHE and Elk Habitat Index calculation, elk herd count trends, and other information. The indicator would be the overall estimated effect (positive, no effect, negative) on the elk herd using the available assessment tools. The decision may also require a site-specific Forest Plan amendment for the EHE standard for the drainages where the standard is not met after implementing Alternative B.

Issue 2: The proposed action would negatively affect motorized/nonmotorized recreation within the project area.

Discussion: The Final Proposed Action (Alternative B) would change motorized access within the project area to a small degree. Table 2-1 displays the current and proposed mileage for all road restriction categories ("R-codes") and trail restriction categories ("TR-codes") in the project area. While the proposal changes totals in various R-code and TR-code categories, the overall change in route mileage open to the public is minor. The overall mileage open to motorized vehicles (including all R-codes that allow access and trails) increases by about 11 miles in Alternative B. The roads open all year, to all size vehicles (unrestricted, or "Open" category) would decrease by about 10 miles. No non-motorized system trails currently exist in the project area, so there is no conversion from non-motorized to motorized status. Concerns were expressed the proposal may affect recreation experiences in the Sleeping Child Inventoried Roadless Area.

Response/Indicator to Describe Effects: The EA includes motorized and non-motorized recreation assessments using road and trail miles, and qualitative assessment of recreational experience quality. The indicators would be the overall estimated effect (positive, no effect, negative) on the motorized and non-motorized recreation experiences using the available assessment tools.

1.8 REGULATORY FRAMEWORK AND CONSISTENCY WITH LAWS, REGULATIONS, AND EXECUTIVE ORDERS

1.8.1 FOREST PLAN – SOIL AND WATER RESOURCES

The Bitterroot Forest Plan's direction for water and soil resources within Management Area 1 is to "Utilize watershed rehabilitation projects such as stabilizing cut or fill slopes, to repair problems" (USDA 1987, p. III-6).

The roads and trails affected by the proposal are located in the following management areas:

- Management Area 1-managed for timber, forage, dispersed recreation (USDA Forest Service, 1987: page III-3),
- Management Area 2-big game winter range (USDA Forest Service, 1987: page III-9),
- Management Area 3a, the visually sensitive areas along the East Fork Highway (USDA Forest Service, 1987: page III-15); and
- Management Area 3b, riparian area, comprises a smaller portion of the analysis area (USDA Forest Service, 1987: page III-22).
- Management Area 5, semi primitive motorized and non-motorized, (USDA Forest Service, 1987: page III-37) – this area includes the Sleeping Child Inventoried Roadless Area.
- Management Area 8a, minimum level, (USDA Forest Service, 1987: page III-58) is located in the eastern portion of Sleeping Child Creek and comprises less than 2% of the project area.

Most of the roads are located in Forest Plan Management Area 1 and 2. The proposed road system in the various Forest Plan Management Areas has been determined through transportation planning to be appropriate for those Management Areas. The process was overseen by an IDT and the proposed changes and related effects are documented in this environmental assessment. (USDA 1987, p III - 3-7).

All of the alternatives are consistent with the Bitterroot National Forest Plan as amended by INFISH and the other fisheries regulatory direction. All of the alternatives would adequately protect the RMOs, native fish, and their habitats. Further discussion on regulatory compliance is included in Chapter 3, Aquatics section.

A site-specific Forest Plan amendment would be required for the Elk Habitat Effectiveness (EHE standard), as the proposal would not meet the standard in all third-order drainages (the Forest Plan standard measurement unit). Further discussion on this topic can be found in Section 3.5.7 – Elk.

1.8.2 STATE AND NATIONAL DIRECTION FOR AQUATIC RESOURCES

All alternatives are consistent with all pertinent Federal and State regulations for water resources and fisheries, including programmatic agreements made with the U.S. Fish and Wildlife Service.

The Clean Water Act provides the overall direction for the protection of waters of the United States, from both point and nonpoint source of water pollution. The Montana Water Quality Act establishes general guidelines for water quality protection in Montana. It requires the protection of Montana's water, as well as the full protection of existing and future beneficial uses. All streams within the analysis area are classified as B1 streams under the Montana Water Classification system. The Administrative Rules of Montana (ARM 17.30.623) require that waters classified as B1 are suitable among other things for the "growth and propagation of salmonid fishes and associated aquatic life."

Presidential Executive Order 12962, signed June 7, 1995, furthered the purpose of the Fish and Wildlife Act of 1956, the National Environmental Policy Act of 1969, and the Fish and Wildlife Coordination Act, seeking to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. This order directs Federal agencies to "improve the quantity, function,

sustainable productivity, and distribution of aquatic resources for increased recreational fishing opportunity by evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order." The proposal is consistent with this direction, as it has positive long-term effects for fisheries in both Sleeping Child and Rye Creeks.

1.8.3 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (NHPA) (AMENDED 1976, 1980, AND 1992)

The primary legislation governing modern heritage resource management is the National Historic Preservation Act of 1966 (NHPA) (amended 1976, 1980, and 1992). All other heritage resource management laws support, clarify, or expand on NHPA. Specific Forest Service heritage resource management practices are based on Federal Regulations 36CFR800 (Protection of Historic Properties), 36CFR63 (Determination of Eligibility to the National Register of Historic Places), 36CFR296 (Protection of Archaeological Resources), and Forest Service Manual 2360 (FSM2360).

Other laws addressing various aspects of heritage resource management on the National Forests include the National Environmental Policy Act of 1969 (NEPA), the National Forest Management Act of 1976 (NFMA), the Antiquities Act of 1906, the Historic Sites Act of 1935, and the Archaeological Resource Protection Act of 1979 (amended 1988) (ARPA). Along with ARPA, two other regulatory acts, the Native American Graves Protection and Repatriation Act (NAGPRA) and the American Indian Religious Freedom Act of 1978 (AIRFA), define the role of Tribes in federal heritage resource management. The National Historic Preservation Act also specifically requires Tribal participation in the consultation process. The Bitterroot Forest Plan tiers to these laws and regulations, and the Forest-wide Management Standards specify the preservation of significant Heritage resources in place wherever possible, cultural resource inventory for most ground-disturbing activities, and consultation with tribal religious leaders on spiritual sites.

No mapped heritage or cultural sites would be affected by the proposed activities. Heritage conservation measures are included in Project Design Features (Table 2.6-1) to protect any new or unmapped sites discovered during implementation.

1.8.4 ENDANGERED SPECIES ACT OF 1973 (AS AMENDED)

Section 7 of the Endangered Species Act (ESA) directs that actions authorized, funded, or carried out by federal agencies do not jeopardize the continued existence of any threatened or endangered species, or result in the adverse modification of habitat designated as critical to these species. The Bitterroot National Forest consults with the US Fish and Wildlife Service (USFWS) as required to ensure the BNF meets the intent of the ESA.

This consultation process uses a document called a Biological Assessment (BA) to describe the effects of the project on threatened and endangered species. To streamline the consultation process the BA is often limited to analysis of an alternative that is likely to be selected. Therefore, the BA and consultation is often completed later in the NEPA process, such as during the preparation of a project decision.

There would likely be separate BAs for terrestrial and aquatic species. The BAs will conclude with an effects determination for each listed species and their critical habitat.

Canada lynx, a threatened species, may occur within the Forest and within the project area as a transient species in secondary habitat, although the Forest is still classified as unoccupied lynx habitat. Consequently, once a selected alternative is drafted, a BA or a programmatic BA will be used to fulfill the ESA consultation requirements.

Bull trout, a threatened species, occurs within the project area in Sleeping Child Creek. Consequently, once a selected alternative is drafted, a BA or a programmatic BA will be used to fulfill the ESA consultation requirements.

1.8.5 CLEAN AIR ACT, 1990

With no prescribed fire components, the Final Proposed Action is not likely to violate this regulation. There have been no reported air quality violations, including those related to road dust, from activities similar to those in the FinalFinal Proposed Action, or resulting from use of motorized routes on the BNF. More effects discussion is provided in Section 3.4, Air Quality.

1.8.6 CLEAN WATER ACT, SECTIONS 303, 319, 404

The proposed alternatives would be consistent with Montana Impaired Waters (303(d)) programs since the proposed activities implement water quality improvement recommended by the pertinent TMDL. Additionally, Montana State Code (75-5-703, Annotated 2001) provision 10 c) states that " new or expanded nonpoint source activities affecting a listed water body may commence and continue provided those activities are conducted in accordance with reasonable land, soil, and water conservation practices". See PF-AQUATICS- 004 and AQUATICS-005for applicable soil and water conservation practices.

MDEQ awarded a 319 grant in November 2014 to implement sediment-reduction activities of road decommissioning and storage from the Final Proposed Action so the project is consistent with this regulation. No activities would occur prior to final NEPA compliance and a signed Decision Notice.

S404 (Dredge and fill in waters of the US) compliance will be fulfilled through the permitting process prior to ground disturbance, as needed.

1.8.7 CONSULTATION AND COORDINATION

The Confederated Salish and Kootenai Tribes of the Flathead Reservation regard the entire Bitterroot National Forest as an area of cultural concern. The tribes exercise treaty rights on the Forest under the 1855 Hellgate Treaty, and are consulted on all Forest undertakings. Consultation with the Tribes regarding this project was completed on May 7, 2012. The tribes requested that road cuts with high probability terrain be examined for cultural materials prior to recontouring activities on decommissioned.

1.8.8 NATIONAL FOREST MANAGEMENT ACT (NFMA)

A. Soil

Proposed activities in Alternative B will not result in irreversible damage to the soil resource. In the vast majority of activities, improved soil productivity would result from reducing compaction, restoring natural hydrology and soil-water relationships, and establishing vegetation. Where new connector trails are proposed, these areas become part of the Forest transportation system and soil productivity standards do not apply. In summary, new routes will incur approximately 3.9 acres loss of soil productivity verses 330 acres returned to productive soils from road decommissioning.

There is no timber harvest activity proposed, and associated soil productivity issues are not pertinent to the project.

B. Silviculture

There are no proposed silviculture or timber harvest activities, and this part of the NFMA does not apply.

1.8.9 MINIMIZING EFFECTS OF TRAVEL MANAGEMENT DESIGNATIONS (36CFR212.55)

This regulation requires consideration of the natural resource effects of travel management decisions. This project is compliant with this CFR as it has used resource specialists, important conservation measures, and multiple design features to minimize the effects of the project on natural resources. More detailed discussion is provided in project file document PF-LAWS-001, and in the DN/FONSI, p. 7.

1.8.10 FOREST PLAN – ELK HABITAT EFFECTIVENESS AMENDMENT

Neither alternative would fully comply with the Forest Plan standard for elk habitat effectiveness (EHE), although activities proposed in Alternative B would improve the EHE percentage in several third order drainages. The project therefore requires a site-specific EHE amendment. Appendix C contains an analysis of the effects of implementing this site-specific Forest Plan amendment.

The site-specific elk habitat effectiveness standard would read, "Existing elk habitat effectiveness will be maintained or improved in third order drainages that do not currently meet the Forest Plan EHE standard within the Darby Lumber Lands Phase I project area."

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 CONTENTS OF CHAPTER

Chapter 2 contains documentation of the relevant issues that were identified during the scoping process, the description of the proposed action, alternatives to the proposed action that were formulated based on the environmental issues, issues and alternatives eliminated from detailed evaluation, and a table summarizing the environmental effects associated with each alternative.

2.2 SCOPE OF THE ENVIRONMENTAL ANALYSIS

The Bitterroot National Forest sent a project proposal letter dated December 11, 2013 ("scoping letter", PF-SCOPING-001) to a variety of organizations, businesses, outfitters, Montana Fish Wildlife and Parks and other members of the public. An article in the local newspapers on December 17, 2013 and a Federal Register notice informed the public of the proposal and opportunities for comment.

The BNF hosted a public meeting for the project at the Supervisor's Office in Hamilton, MT, on the evening of January 8, 2014, with prior public notice posted in local papers and the Forest internet page (PF-SCOPING-002). A list of interested stakeholders also received email notice of the project and public meeting (PF-SCOPING-003). The District Ranger signed a 30-day extension for comments as requested by the public (PF-SCOPING-005).

Responses helped define the level and scope of the analysis. The scoping process generated 28 responses (PF-SCOPING-004) and helped determined the scope of this assessment. An IDT composed of natural resource specialists reviewed these comments. The IDT identified the relevant issues with the help of the deciding official. The issues are resolved by:

- adding operational guidelines and conservation practices to reduce effects;
- including discussion in chapter 3 to explain effects; and
- modifying the Proposed Action to address the issue.

There were no issues that could not be addressed by the above approach, and no new alternatives were developed in response to comments. Section 2.7 discusses alternatives that were considered but eliminated from detailed study.

The BNF changed the Project Area boundary, which defines the area affected by the decision, in response to public comment. The biggest change was dropping acquired Section 35 T4N, R20W (Cold Spring Hill area) from the current proposal to allow for more data collection. Changing the Project Area boundary created different baseline road numbers and therefore they do not exactly match those used in the scoping letter.

2.3 ALTERNATIVE DEVELOPMENT PROCESS

The ID Team modified the original Proposed Action after considering issues and comments brought up by the public. The IDT used comments to refine the proposal, reduce the potential for adverse environmental effects, and increase benefits of the activities. The scoping letter (PF- SCOPING-001) and Chapter 1 – Purpose and Need – explain the process used in developing the original Proposed Action. This original proposal was changed to the *Final Proposed Action*, or Alternative B, in response to public comments (Sections 1.6.2 and 1.6.3, above).

2.4 DETAILED DESCRIPTION OF ALTERNATIVE A (NO ACTION)

Evaluation of the no-action alternative is required under the National Environmental Policy Act (1969). It provides a basis for comparison of the other alternatives.

Under the No Action alternative, no road decommissioning or storage would take place. Implementation of the proposed OHV and motorcycle loops, with road-to-trail conversion and new connector construction, would not occur. Legally sanctioned activities that currently occur on open roads and trails would continue. This includes public travel with motor vehicles on those routes that are designated open to motor vehicles. This alternative would defer storage or decommissioning of existing roads and trails, and the construction of new trails, until some later date. Timing of that work would depend upon which alternative is chosen in the Travel Plan Decision and when the Forest could get around to completing the required environmental analysis and documentation. The proposed aspen treatments would not be implemented in Alternative A.

2.5 DETAILED DESCRIPTION OF ALTERNATIVE B (FINAL PROPOSED ACTION)

Alternative B proposes to:

- Decommission approximately 66 miles of roads, using various treatments;
- Store approximately 54.5 miles of road, using various treatments;
- Change motorized access on 10 miles of existing yearlong open routes;
    - Total existing yearlong open routes = 70.3 miles
    - Propose to close 0.5 mile, store 5.7 miles, and change 3.5 miles to seasonal restriction;
    - Proposed yearlong open routes in Alternative B = 60.6 miles
- Change 19 miles of “undetermined” status roads to system roads;
- Open 10.3 miles of existing, but currently closed, road to complete seasonal access loops for OHVs<50” in width;
- Add 5.3 miles of new OHV/motorcycle trail “connectors” to help build several loop routes with the existing roads, and improve the continuity of the TR104 single-track route;
- Build 0.4 miles of new, specified road to bypass private property at the Crystal Mine; and

- Thin conifers within two aspen stands (49 acres total) to increase aspen longevity and provide wildlife benefits.

Details on the proposed road and trail system changes are summarized below in Table 2.5-1.

Alternative B activities would include:

a. Changing motorized access on specific routes. Some closed roads would be opened and some open roads would be closed, to provide a reasonable motorized access system within the project area. The class of vehicle (e.g., full sized, OHV less than 50" in width, single track) may also be changed.
b. Ripping or decompaction of roads surfaces as needed during decommissioning and storage treatments to restore infiltration of water into road surface and to help reestablish vegetation
c. Water bars, rolling dips, grade reversals and outslope sections on any road prism, as needed, to reduce erosion.
d. Placement of rock as needed to create stable stream crossings, block vehicle use or prevent erosion
e. Recontouring road segments as needed to block vehicles and reestablish water infiltration and subsurface water flow.
f. Removing culverts to reestablish unrestricted stream flows and prevent road fill washouts
g. Restoring former stream culvert sites to stable stream channels; rock, woody debris, native shrubs, mulch, woody debris or other materials may be used to reestablish vegetation and reduce erosion into streams at these points.
h. Up to 10 years of ground-disturbing activities, as the agency and partners implement the proposal. The most likely duration of restoration activities is less than 5 years, as substantial funding is currently available. OHV-related activities would progress as funding allows, and may take up to 10 years to implement.
i. Opening of specific road prisms to OHVs < 50" in width, after treating erosion problems with waterbars, dips,seeding, hardening, and other methods. Narrowing of some road prisms where appropriate to protect water resources or restrict full-size vehicles.
j. Building about 5 miles of new connector trail segments by hand and motorized equipment, to Forest Service specifications.
k. Removing non-commercial conifers in 49 acres of aspen at two sites, using chain saws to fell and lop sapling-sized trees that would remain on-site.

Tables detailing the proposed route system changes are located in Appendix A:

- Table A-1 - Roads with proposed Access Changes
- Table A-2 – Proposed Status of Designations for Roads Currently in "Undetermined" Status
- Table A-3 - Road Decommissioning Candidates
- Table A-4 - Road Storage Candidates
- Table A-5 - Project Area Road Date
- Table A-6 - Project Area System Trail Data

Maps presenting the proposed route system changes are included as Project File (PF-MAP-001 through 004) documents:

- PF-MAP-001: Map 1 – Roads with proposed Access Changes
- PF-MAP-002: Map 2 – Designations for Roads Currently in "Undetermined" Status
- PF-MAP-003: Map 3 – Decommissioning and Storage Candidates
- PF-MAP-004: Map 4 – Project Area Roads and Trails after implementing Alternative B

Table 2.5- 1: Project Area Transportation System, Before and after Implementing Alternative B, the Final Proposed Action

Road Access Status or "R-code" from Forest Visitor Map	**Current (miles)**	**Proposed (miles)**
Open	70.3	*60.6
R-1 closed	119.8	5.9
R-1 currently stored	19.5	19.5
R-2	13.4	8.1
R-3	31.6	22.3
R-4	6.7	23.6
R-6	2.3	0
R-7	0	4.2
R-9	0.6	0.6
Proposed Decommissioning	NA	65.8
Proposed Storage – (R-1 after treatment)	NA	54.5
Totals	264.1	264.5
Trail System	**Current (miles)**	**Proposed (miles)**
Single Track- open year long	13.2	8.69
Single Track- open seasonally	0.7	**8.1
OHV < 50" width - open seasonally	0.0	**2.0
Totals	13.9	18.8
New Proposed Routes	**Current (miles)**	**Proposed (miles)**
Full Size Vehicle - Open	NA	0.4
OHV < 50" width - TR-2	NA	2.0
Single Track - TR-2	NA	2.8
Totals	NA	5.3
General Transportation System Summary (Roads and Trails)	**Current (miles)**	**Proposed (miles)**
Subtotal - Route miles with motorized access	138.8	133.9
Subtotal - Route miles closed to motorized access	148.8	83.5
Subtotal - Route miles removed from NF System	NA	65.8

* Includes proposed Full size route (Crystal Mine Bypass, 0.4 mile).

** Includes new proposed Single Track (2.8 miles) & OHV connectors (2 miles).

2.6 PROJECT DESIGN FEATURES, MITIGATION AND MONITORING

2.6.1 DESIGN FEATURES

The following list includes those actions that would reduce environmental effects and help implement the project. Successful conservation measures are included with road decommissioning, prism obliteration and trail building projects to minimize adverse environmental effects.

In contracted work, a Contracting Officer's Representative is designated as the responsible official. For non-contracted work, the Forest's watershed, or other specific staff (heritage, hydrology, wildlife, trails, soils or fisheries) would be responsible for implementing the design features on the ground. Overall, the BNF Deciding Official is responsible for implementation of the project, including Design Features or Mitigation Measures, as detailed below.

Table 2.6- 1: Alternative B Design Features

OBJECTIVE	DESIGN FEATURE
Minimize soil erosion and disturbance; Improve hydrologic processes; Minimize sedimentation into streams	• Activities will comply with Road Best Management Practices (BMPs) to minimize effects to soil resources. BMPs are listed in PF-AQUATICS-004 (MT DNRC) and AQUATICS-005 (USDA 2012). Many planning-related BMPs are already included in the proposal. • Rip, subsoil or decompact road surfaces where it appears ripping would help restore hydrologic function. If road surfaces are not eroding, have no culverts needing removal and have vegetation indicating appropriate recovery, they would not be ripped or recontoured. Responsible Official: Contracting Officer's Representative or watershed staff
	• Soil disturbances associated with road treatments, or other areas would be rehabilitated as soon as possible using treatments such as re-contouring, seeding, fertilizing, and covering with slash or weed-free straw mulch. • Use a native weed-free seed mix to reestablish vegetation, as needed, to stabilize soils and reduce invasive plant effects. • Plant native shrubs in disturbed sites as budget allows. • Conduct work during the dry conditions, as needed. Contracting officer's representatives or watershed staff would determine those times when conditions are too wet to operate close to streams. Contract clauses restricting operations to drier days would be included in any contracts. Responsible Officials: Contracting Officer's Representative and the Forest Contracting Officer
Prevent the spread of noxious weeds	• Conduct weed suppression prior to the decommissioning work and schedule follow-up weed suppression, as needed, and within guidelines from the 2003 Bitterroot Weeds EIS. • Follow weed management practices in FSM 2080. For instance, all contractor equipment would be washed to remove weed material and weed seeds prior to coming onto the Forest and beginning work. Responsible Official(s): Contracting Officer's Representative, Bitterroot National Forest Invasive Species Program Coordinator. • Use a native weed-free seed mix to reestablish vegetation, as

OBJECTIVE	DESIGN FEATURE
	needed, to stabilize soils and reduce invasive plant effects.

Minimize aquatic effects; comply with MDEQ regulations	• The Montana Department of Fish Wildlife and Parks in accordance with the Montana Stream Protection Act is reviewing this project. A Streamside Protection Act 124 Permit would be acquired prior to culvert removal or any other activities that involve direct disturbance to streams. Some of the permit requirements would be as follows.
	
	  • All in-stream work would be completed in an expeditious manner to avoid unnecessary impacts to the stream;
	  • Extra precautions would be taken to preserve existing riparian vegetation, and replant disturbed vegetation where feasible;
	  • All activities performed in the stream and immediate vicinity would be conducted in a manner to reduce in-stream turbidity along with minimizing disturbance to the streambed and/or banks of the stream;
	  • Machines would cross open stream channels as few times as possible;
	  • All stream bank and adjacent areas disturbed by activity would be protected with temporary erosion control measures as soon as possible. These areas would be mulched, seeded and fertilized immediately after construction;
	  • The excess or excavated material would be placed in a area where it would not damage vegetation, cause erosion or add to sedimentation after removal or prior to their use;
	
	Work would be completed as outlined in the SPA 124 permit application and as discussed on site. Responsible Official(s): Contracting Officer's Representative, Hydrologist
	
	• No ground disturbance or use of heavy equipment would occur in wet areas such as seeps, springs or bogs. The exceptions to this would be road surfaces with boggy areas due to seeps and those areas where roads crossed streams or seeps with culverts. These areas would be restored to natural slope contours. Isolated wetlands on road surfaces may be retained if preservation does not conflict with other objectives. Responsible Official: Contracting Officer's Representative

Protect Cultural and Heritage Resources	The DLL and surrounding sections have had past surveys for cultural resources. None of the proposed decommissioning would affect any known sites. A special provision would be included in any contracts that would require the equipment operator to stop work if a site is encountered. The site would

OBJECTIVE	DESIGN FEATURE
	then be avoided or stabilized as needed. Responsible Official: Contracting Officer's Representative, Heritage Program Manager, Deciding Official
Minimize adverse wildlife effects	• Use smaller intermediate or suppressed trees that do not contribute to the main canopy of the adjacent forest as woody materials for erosion control or route closure. Avoid using wildlife snags or trees with potential to become wildlife snags. Responsible Official: Contracting Officer's Representative, Wildlife Biologist. • If an active Goshawk nest is found within the project area, schedule the use of heavy equipment after either August 1 or at least ½ mile away from site. Responsible Officials: Contracting Officer's Representative and the District Wildlife Biologist
Public Safety	For public safety, work areas would be signed disclosing the operation of heavy equipment. Responsible Official: Contracting Officer's Representative or watershed staff.
Travel Management	• Road segments closed to motorized use will be re-contoured or closed with boulders as needed to restrict traffic to open routes. • The BNF will work with local OHV groups to promote responsible rider education. Responsible Official: Contracting Officer's Representative, District Ranger or watershed staff

2.6.2 MITIGATION

Mitigation measures are those operational limits that go beyond normal conservation practices to reduce or eliminate resource effects. Mitigation for this project includes:

1. Road and trail drainage structures (BMPs) will be in place and effective prior to public use of new motorized routes, including existing roads opened for motorized use. Responsible Official: Contracting Officer's Representative, District Trails Specialist.
2. Within mapped lynx habitat (PF-WILD-032), roads proposed for decommissioning will not be ripped or recontoured if the vegetation on the road prism has recovered to the point that it appears to provide snowshoe hare habitat (high stem densities of conifer seedlings and saplings that exceed the depth of the maximum snowpack in winter). Decommissioning treatments on these roads will be limited to barricading the entrance of the road.
3. Modify or increase protective measures, such as drainage structures or barriers, where results from the proposed monitoring suggest additional resource protection is needed or change management to resolve issues.

2.6.3 MONITORING

BNF monitoring results have found that similar road treatment projects have been successful in meeting watershed and fisheries goals of reducing road system effects (PF- AQUATICS-001). These results suggest this project will have similar effects and high-level, project-specific monitoring is not necessary. The proposed monitoring is based on implementing the project according to the Design Features Table 2.2. The BNF has an ongoing program to monitor OHV use off designated trails and roads, and this would occur within the project area. This project would include specific monitoring as follows:

1. Inspect contracted work with certified contracting officer representatives, and inspect Forest crew and Partnership-accomplished work with watershed staff. The Forest Watershed group is responsible for seeing that the work is accomplished to specification, using watershed program funding.
2. Inspect decommissioning and storage work within the first three years after completion to assess the level of success in reestablishing watershed processes and erosion-control seeding. The hydrologist and soil scientist are responsible for checking re-vegetation effectiveness, using watershed program funding.
3. Monitor new OHV and single-track routes for resource effects within the first two years, using photo-point documentation and an interdisciplinary approach. The trails, soils and hydrology staff are responsible for checking OHV effects and making recommendations.
4. Monitor compliance with access designations using the OHV Ranger, Trails staff and Law Enforcement Officers, as budget and staffing allows.

2.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

NEPA requires Federal agencies to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods to achieve the purpose and need. Some of these alternatives may have been outside the project scope of reducing road effects on watershed processes, aquatic resources including water quality, providing sustainable recreational access or improving the longevity of several aspen stands for wildlife benefits. They may also have been duplicative or determined to be components of alternatives considered in detail. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

The Forest Service received 28 comments suggesting alternatives to the proposed action (PF- SCOPING-004). Many comments made suggestions that would be components of the alternatives, as either a Design Feature or an additional activity and did not require a specific alternative to address them. Several comments supporting fire suppression access and walk-in hunting routes are addressed by the inclusion of the No-Action Alternative, which maintains the current motorized route system.

Several comments raised concerns about the effects on water quality, fish, or terrestrial wildlife from implementing the decommissioning and storage road treatments. Reviewing past monitoring from similar projects suggests design features and BMPs can minimize these short-term effects. The IDT responded to these comments by including additional design features to this project to minimize environmental effects in (Table 2.6.1). These design features successfully minimized potential short-term sediment effects from recent, similar road treatments implemented in similar environmental settings (PF- AQUATICS-001). The BNF expects similar success from using them in this project, and the issue therefore does not warrant a

separate alternative or additional assessment. Discussion added to Section 3.5 includes the potential for wildlife effects from these activities, which are predicted to be minor based on past project experiences.

Several comments suggested alternatives that were considered but not analyzed in detail. These suggested alternatives, and the rationale for not analyzing them in detail are as follows:

2.7.1 OHV CLUB PROPOSAL

A local motorized recreation club (Ravalli County Off-Road Users Association, "RCORUA") proposed a specific set of routes for several vehicle classes, most of which would be closed to full-size vehicles. These included both loop routes and routes to several destinations using both new trail and existing road prism. Club members and other public parties supported the route system in their comments, although other stakeholders expressed concern over the potential adverse environmental and recreational effects of the proposed routes. Project File Document PF SCOPING-010 provides more detail on the suggestions from RCORUA. The IDT and Ranger reviewed the proposals in detail, found several parts of the proposed routes could be included in Alternative B, meet the project's watershed improvement goals if specific design features were included and have minimal effect on non-motorized use in the project area. The IDT and Ranger also determined that the BNF could accomplish the loop route objective of the RCORUA proposal with less resource damage or risk (fewer water crossings, less erosion, smaller final motorized route system) and less long-term transportation system cost by using slightly different routes, some which would be shared with full-size vehicles.

Because of the numerous roads in the area, many different road configurations are possible for decommissioning or retention on the system. To help determine the project treatment scale and intensity, the IDT and Deciding Official considered that watershed improvement is the primary emphasis for this project. Recreational access and road system costs were important but secondary drivers. Sleeping Child Creek is MDEQ-listed for sediment impairment and has a population of Bull trout, an ESA threatened species, giving it highest priority for sediment reduction. Rye Creek is listed by MDEQ as sediment-impaired, with a substantial native fishery and a long history of intensive forest management. Current conditions in Rye Creek support extensive watershed improvement treatments. Including a more extensive motorized route system may contradict the restoration aspect of the Purpose and Need.

In the end, the IDT and Ranger incorporated several changes into the route system for the Final Proposed Action (Alternative B), to respond to these comments. Since much of the objective of the RCORUA proposal was able to be included, at lower resource risk, a specific alternative for the RCORUA proposal was not developed.

2.7.2 ELK HABITAT STANDARD PROPOSAL

Several members of the public proposed closing enough currently open roads to meet Forest Plan Elk Habitat Effectiveness standards where current management does not currently meet it. The Responsible Official considered an alternative that would meet the Forest Plan standard for elk habitat effectiveness. The existing condition for EHE does not meet this standard in seven of the thirteen third order drainages, wholly or partially, within the Project Area. Meeting the standard would result in substantial reductions in the public's ability to access and enjoy portions of the Forest. Access routes open to public motorized travel would largely be limited to the existing main "through" roads, such as the Skalkaho-Rye and North Fork Rye-Blacktail roads. Restrictions on motorized use of existing roads would limit the public's ability to reach areas traditionally used for hunting, camping, firewood gathering, and other recreational pursuits. Alternative B moves many third-order drainages closer to meeting the EHE standard.

For these reasons, an alternative to meet the Forest Plan standard for EHE within the Darby Lumber Lands Project Area was not considered in detail. Effects discussion includes the effect of open roads and trails on the local elk population, including comparison of existing and proposed EHE values.

2.7.3 WATERSHED RESTORATION ACTIVITIES ONLY PROPOSAL

Several commenters suggested an alternative that would propose only watershed restoration-type activities, without including new motorized routes. While this would meet a portion of the project Purpose and Need, it would not improve recreational access to newly acquired lands, part of which the reason for acquiring was to preserve public access. The IDT's preliminary assessment suggested a large net reduction in road system watershed effects could be accomplished while maintaining a level of motorized access. Project analysis suggests the proposed route system management provides a similar level of motorized access when compared to current levels, but provides a recreational experience that is currently limited on the Darby Ranger District (routes open to OHVs <50" in width but closed to full-size vehicles). Also, with the inclusion of road and trail-related BMPs (PF-AQUATICS-004 and AQUATICS-005) and Design Features (Table 2.6-1) in the new connectors and existing roads prior to public use, the watershed effects would be minimized, with existing drainage problems fixed prior to opening. Lastly, the IDT and Ranger added several routes to the storage and decommissioning candidates to respond to public comment. FR5610 (Fishtail Road) was dropped from consideration as an OHV route because of wildlife and aquatic effects. For these reasons, this alternative was not analyzed in detail. Effects of the proposed OHV<50" routes are included in the context of other proposed activities in Chapter 3 sections for Aquatics, Soils, Wildlife and Recreation/Trails. Discussion on the potential economic effects of a Restoration-Only Alternative are discussed in Section 3.10.2-A.

2.7.4 NON-MOTORIZED PROJECT AREA PROPOSAL

Several commenters suggested the whole Project Area be designated a non-motorized access or walk-in area. While this may have benefited several resources and non-motorized recreationists, it would have severely limited motorized access in an area historically open to this type of use and currently having a Management Area designation that supports motorized recreational access. This alternative, if applied across the project area, would result in substantial reductions in the public's ability to access and enjoy portions of the Forest. The IDT and Ranger considered this option during the alternative development process, and ended up emphasizing a lower level of motorized access in the upper Sleeping Child watershed, which complements the existing Sleeping Child Inventoried Roadless Area character. Section 1, T3N, R19W, P.M.M. would have all roads decommissioned, and a large portion of roads higher in the watershed would also be stored or decommissioned (PF-MAP-003, Decommissioning and Storage Candidates). Alternative B proposes a somewhat higher level of motorized access in the Rye Creek portion of the project area that still meets the Purpose and Need. This was determined to be appropriate for the MA-1 designation of most of the Project Area, and a completely non-motorized alternative was not, and therefore not analyzed in detail.

2.8 COMPARISON OF ALTERNATIVES

This section provides a summary of the effects of implementing each alternative. Table 2.8-1 displays the transportation system (roads and trails) details for the Existing Condition and Final Proposed Action, which represent Alternatives A and B, respectively. The table also displays the potential resource effects resulting from the two alternatives and is focused on activities and effects where different levels of effects can be distinguished quantitatively or qualitatively among alternatives.

Table 2.8- 1: Comparison of Alternative Effects of the Darby Lumber Lands Project.

Issue and Indicator	Alternative A – No Action	Alternative B – Final Proposed Action
#1 - Effects on Elk Herd	No Effect – current elk herd trends would continue, unchanged from this project. No Change in EHE or other measures.	Net positive effect for EHE, but Forest Plan standard not met in six third-order drainages. Overall minor positive effect to elk based on other indicators.
#2 - Effects on Motorized Recreation	No Effect – motorized recreation access would be unchanged from this project. No change in motorized access.	Net positive effect predicted. Loop routes for OHV <50" in width benefit motorized recreation resource, although slight reduction in unrestricted (Open) routes will negatively affect some users.
#3 - Effects on Non-motorized Recreation	No Effect – non-motorized recreation access would be unchanged from this project.	Minor negative effect on non-motorized recreation due to fewer "walk-in" routes and new motorized use in acquired sections. Sleeping Child IRA effects negligible to minor.

2.9 CHANGES BETWEEN DRAFT AND FINAL EA

The draft EA for this project received 46 comment letters, including many detailed suggestions and ranging from full support to not supporting the project as proposed. Additional information was supplied to many commenters through the comment response process and through additions to the EA. The changes in Alternative B as a response to comments for the Final Proposed Action include:

1. Dropping the proposed "Fishtail" OHV route. Changing the proposed motorized access designation of FR5610 (Fishtail Road) from R-7 (Closed to Full Size Year-round, Open to OHV < 50" in width from 6/16 to 10/14) to R-1 - stored (Closed to all motorized Year-round). The associated connectors I and L have been dropped from Alternative B as well, and FR62491 proposed motorized access designation changed from R-7 (Closed to Full Size Year-round, Open to OHV < 50" in width from 6/16 to 10/14) to R-1 (Closed to all motorized Year-round). These changes responded to many comments voicing concern over this proposed route. MT Fish, Wildlife, and Parks comments raised concerns over having a motorized route bisecting one of the few large elk security areas within the Rye Creek watershed. The MT Department of Environmental Quality expressed concern about using open ford stream crossings in a watershed listed on the 303(d) list for sediment-related water quality impairments. Many private parties expressed concern as well, mainly for these reasons. After considering agency and public comments, the Ranger decided to drop this route from further consideration. The first 150 feet of FR5610 at the junction with FR75 (Skalkaho-Rye Road) would be re-contoured to discourage motorized use.
2. Changing proposed season of use for TR104 – Sleeping Child Divide Trail. The proposed motorized access for this trail in Alternative B was changed from TR-3 (closed 10/15 to 6/15) to TR-2 (closed 10/15 to 12/1). This change responded to many comments supporting spring single-track use on this popular trail, while still reducing disturbance and user conflicts during big-game rifle season from the existing designation, which is open year-round.

3. Changing proposed access designations for portions of FR13241 and FR13242 from R-2 (Closed to all motorized 10/15 through 12/1) to R-1 – stored (closed to motorized access year-round). This change responds to concerns over increasing the open route mileage in a watershed with a high level of existing motorized access, but still allows for motorized access through this area east of N. Fork Rye Creek. The segments changed to R-1 in this response are grown in to various degrees, and do not connect through to other routes.

Minor changes were made throughout the document to reflect the changes listed above, including effects discussion in Chapter 3. The DN/FONSI Appendix B lists all comments and responses, many of which included requested additions or changes in the Final EA, the Project File, or Appendices.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter contains information related to the current environmental conditions (affected environment) and the direct, indirect and cumulative beneficial and adverse environmental consequences of implementing the Alternatives A and B, including a site-specific Forest Plan amendment for the Elk Habitat Effectiveness (EHE) standard. The need for this amendment is discussed in both the wildlife section and EA Appendix C.

There are no unique characteristics of the area such as prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. There are no significant historic or cultural resources.

3.1 RECREATION AND TRAILS

3.1.1 BACKGROUND

Outdoor recreation provides valuable quality-of-life benefits to Montanans and citizens throughout the United States. It contributes to the health and well-being of individuals and communities of all types. Benefits include social bonding with friends or family, and mental and physical conditioning which contribute to emotional well-being. According to a national study, two-thirds of the American public engages in some type of outdoor recreation at least several times a month (Roper and Starch 2000). This same study suggests that outdoor recreation also plays a positive role in improving education and environmental awareness, and in reducing childhood obesity, juvenile crime, underage drinking, and illegal drug use.

It has long been established that non-motorized fitness activities such as running, hiking, skiing, and biking provide long-term health benefits to those who participate. However, in 2007, York University in Toronto, Canada conducted a series of studies exploring the quality of life and mental and physical functioning of off-highway vehicle (OHV) riders ((Health & Fitness Journal of Canada 3.1 (2010)). Research pointed towards higher levels of physical functioning, vitality, general happiness, and quality of life for recreational off-highway vehicle riders as a consequence of participation in the sport. Additionally, operating these OHVs is physically demanding as well as mentally challenging.

The changing complexion of the aging population indicates those over 65 are living longer. Fitness activities and enjoying the outdoors provide the physical activity needed for good health and mental stability for the aging population. However, the outdoor recreation demands for the aging population are unknown as this unique situation has not been experienced by managers of recreation and natural resources in the past. More users are looking for easy day use activities of all types, and have voiced concern about the accessibility of road and trail opportunities on the Forest. Evolving technology that allows people to traverse portions of public land that were inaccessible ten years ago, along with increasing personal wealth and spare time, contribute to growing issues surrounding travel management on public lands (USDA 2003a). The Montana Statewide Comprehensive Outdoor Recreation Plan (SCORP) echoes several of these issues, and notes that the continued access to, and maintenance of, rural and backcountry trails for hiking, biking, horseback riding, and OHVs and snowmobiles is a concern across the state, as well as noting a shortfall in the available miles and maintenance of urban and rural trails (Montana Fish, Wildlife & Parks 2003).

In the past, use in the Bitterroot Valley was once timber, mining, and ranching related. The last 20 years has brought land owners who see the area as a recreation destination. This has brought a different type of recreational user into the community, one with more disposable income and time for both motorized and non-motorized recreation. In summer and winter months, recent changes and advances in technology have

led to motorized machines that can go places not accessible several years ago. Increases in motorized use have led to a demand for allocated use areas so both motorized and non-motorized users can enjoy their sport.

Roads and trails provide access to the Bitterroot National Forest. Roads are used to access areas for hunting, berry picking, fishing, camping (developed and dispersed), driving for pleasure, firewood gathering, and Christmas tree harvesting. They also provide access to trails for use by Off Highway Vehicles (OHVs), motorcycles, horseback, bike, and by foot. Roads offer easy access, year-round, to a variety of forest-based activities, and allow for year-round viewing of the Forest's abundant wildlife including big horn sheep, elk, moose, and whitetail deer.

Trails allow visitors to access the backcountry for fishing, photography, and viewing scenery, visiting lakes, exercise, and many more activities. The type, amount, and location of motorized routes influence motorized recreation opportunities and the quality of the recreation experience. Motorized routes provide opportunities for users of single and double track vehicles to enjoy the Forest at their own pace and challenge levels at various elevations while enjoying the scenic beauty of the area

The Bitterroot National Forest Plan provides the foundation for the current travel management plan. The Forest Plan identifies both Forest-wide and management area (MA) goals and standards for recreation management. Forest-wide goals are: "To provide a broad spectrum of recreation experience opportunities" and "Provide a safe trail system that protects soil and water resources" (USDA Forest Service 1987a). Forest-wide and MA standards are consistent with the Forest Plan, laws, and regulations.

The Bitterroot National Forest – Forest Plan Management Areas and their recreation direction (including motorized access) are detailed in the project's Travel Analysis Process (PF- TRANS-001). The project meets the recreation direction for these analysis areas.

3.1.2 FOREST SERVICE TRAILS – GUIDELINES AND CLASSIFICATION

This section includes trail management, classification and maintenance direction. It also provides information on how the trail management and building proposed in this project fits into this direction.

Source: FSH 2309.18 - Trails Management Handbook, Chapter 10 – Trail Planning and Chapter 20 Trail Development

3.1.3 TRAIL CLASS MATRIX

Trail Classes are general categories reflecting trail development scale, arranged along a continuum. The Trail Class identified for a National Forest System (NFS) trail prescribes its development scale, representing its intended design and management standards. Local deviations from any Trail Class descriptor may be established based on trail specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

The Forest Service Handbook directs field units to "identify the appropriate Trail Class for each NFS trail or trail segment based on the management intent in the applicable land management plan, travel management decisions, trail-specific decisions, and other related direction. Apply the Trail Class that most closely reflects the management intent for the trail or trail segment, which may or may not reflect the current condition of the trail."

Each Trail Class is defined by Trail attributes: Tread and Traffic Flow, Obstacles, Constructed Features and Trail Elements, Signs, and Typical Recreation Environs and Experience.

- Trail Class 1: Minimally developed

- Trail Class 2: Moderately Developed
- Trail Class 3: Developed
- Trail Class 4: Highly Developed
- Trail Class 5: Fully Developed

3.1.4 TRAIL OPERATION AND MAINTENANCE CONSIDERATIONS

Trail Operations and Maintenance Considerations are general guidelines for developing trail prescriptions and managing, operating, and maintaining NFS trails. The considerations are a starting point and likely will need to be adapted to reflect local financial capability and other circumstances. Exceptions to the Trail Operation and Maintenance Considerations may occur at the trail-specific, district, forest or grassland, or regional level.

Trail Operation and Maintenance consideration according to their Trail Class is defined by Trail Attributes: Trail Management, Maintenance Indicators, and Routine Maintenance Frequency and Intensity.

The Forest Service has Design Parameters for the types of NFS trails: Hiker/Pedestrian, Pack and Saddle, Bicycle, OHV <50" wide, Motorcycle, Cross-Country Ski, and Snowmobile. The agency has defined the factors in the design Parameters including: Design Tread Width, Design Surface, Design Grade, Design Cross Slope, Design Clearing width and Height, and Design Turns.

Table 3.1-1 Existing Trail Routes and Specifications provides trail class, designed use and restrictions for each trail already existing in the project area. All of the existing trails located in the project area have motorcycles as an accepted use.

Table 3.1- 1: Existing Trail Routes and Specifications.

Trail Number	Trail Name	Trail Mileage	Trail Class	Designed Use	Trail Restriction
104	Sleeping Child Divide	4.47	2	Pack and Saddle	none
288	White Stallion Camp	1.20	2	Pack and Saddle	none
84	South Fork Sleeping Child	6.52	2	Pack and Saddle	none
500	Corral	0.62	2	Pack and saddle	none
504	Rye Creek-Hot Springs	2.28	2	Hiker Pedestrian	none
102	Mosquito Meadow	0.74	2	Pack and Saddle	none
505	Access	1.26	2	Hiker Pedestrian	none
164	Little Sleeping Child	1.39	2	Hiker Pedestrian	none
	TOTALS	**18.84**			

Sleeping Child Divide Trail #104 is the only existing trail that would be affected by this project. Discussion on those effects is included below in the Effects Discussion.

All new OHV routes would be designed as Trail Class 3 for this project. The target goal is to allow vehicles 50" or less in width to ride these trails. A Trail Class 3 tread width would be greater than 50"; allowing for extra width for the safety of the rider. A trail often times becomes narrower over time; soon 60" vegetates back into a 50" tread. Proposed new trail routes are displayed in Table 3.1-2.

Table 3.1- 2: Proposed New Trail Routes

Trail Number	Trail Name	Trail Mileage	Trail Class	Designed Use	Trail Restriction	Implementation Requirements
TBD	Conn A	0.84	3	OHV <50"	TR-2	Balanced Bench construction
TBD	Conn B	0.24	3	OHV <50"	TR-2	Balanced Bench construction
TBD	Conn C	0.13	3	OHV <50"	TR-2	Balanced Bench construction
TBD	Conn D	0.28	3	OHV <50"	TR-2	Balanced Bench construction
TBD	Conn G	0.22	3	OHV <50"	TR-2	Full Bench construction
TBD	Conn H	0.30	3	OHV <50"	TR-2	Balanced Bench construction
	Totals	**2.0101**		**OHV**		
TBD	Trail 104 part A	0.90	3	Motorcycle	TR-2	none
TBD	Trail 104 part B	0.85	3	Motorcycle	TR-2	none
TBD	Trail 104 part C	0.27	3	Motorcycle	TR-2	none
TBD	Trail 104 part D	0.39	3	Motorcycle	TR-2	none
TBD	Trail 104 part E	0.44	3	Motorcycle	TR-2	none
	Totals	**2.8585**		**Motorcycle**		
	TOTALS	**4.8686**				

3.1.5 IMPLEMENTATION REQUIREMENTS

The *USDA Forest Service Standard Trail Plans and Specifications* - http://www.fs.fed.us/recreation/programs/trail-management/trailplans/index.shtml **are specifications for the design, construction, and maintenance of National Forest System trails and trail bridges. These plans and specifications also are available for other Federal, State, and local agencies, communities, trail partners, volunteers, and entities.**

The Standard Trail Plans and Specifications reflect current Forest Service trail management efforts and the agency's Trails Data Dictionary for constructed features and tasks. The Forest Service's National Technology and Development Program (T&D) developed them in conjunction with the agency's National Trails Program, with funding and support from the Federal Highway Administration, Recreational Trails Program. These Standard Trail Plans and Specifications supersede the 1996 *USDA Forest Service, Standard Drawings and Specifications for Construction and Maintenance of Trails*.

Examples of the drawings used for All - Terrain Vehicles, trail class 3 are:

(1) Clearing Limits 911-1, clearing height of 6' to 8', a clearing width of 60" to 72", and a shoulder clearance of 6" to 12". Do not remove trees over 8 inches diameter if they are over 4 feet from the center line (both sides). Stumps must be cut flush to ground.

(2) Typical Trail Cross Section 912-1, construction of trail will consist of full bench construction when side-slope is greater than 50%; three-quarter bench will be constructed when side-slope is 30% to 50%; balanced section of cut and fill will be constructed when side-slope is 10% to 30%; route designation and minimal construction is needed when side-slope is under 10%.

(3) Grade Dip 912-4, will be the preferred method of water erosion control on new construction routes.

(4) Insloped Climbing Turn 912-9, constructed when side-slope is less than 25%. The turn will maintain a constant grade throughout the entire turn. The radius of the turn will be 8' to 10'.

(5) Switchback – Type 1 914-1, will be constructed when side-slope grade is greater than 25%. The radius of the turn will be 8' to 10', with a 5% grade or less for the platform.

3.1.6 TRAIL RESTRICTIONS (TR)

The Bitterroot National Forest's Visitor Map (2005) displays motorized travel management restrictions, established under current Federal laws and regulations, on National Forest System land. It uses the following Trail Restriction (TR) codes. These closures are in effect during the dates shown below. Forest trails are closed to vehicles that do not fit on existing trail tread (e.g., a two-track vehicle may not use a single-track trail). TR Codes used on the Bitterroot National Forest are displayed in Table 3.1-3.

Table 3.1- 3: Current Bitterroot National Forest Trail Restrictions or "TR Codes"

Trail Restriction	All-Terrain Vehicle	Two-Wheel Motorized Bike	Snowmobile	Management Purpose
	Yearlong	Yearlong	Yearlong	Provide for public safety, reduce soil erosion, or protect wildlife.
2	Oct. 15 – Dec. 15	Oct. 15 – Dec. 1	Oct. 15 – Dec. 1	Protect wildlife and provide wildlife security during hunting season.
3	Oct. 15 – June 15	Oct. 15 – June 15	Oct. 15 – June 15	Provide wildlife security during hunting season.
4	FOOT TRAFFIC ONLY, CLOSED TO STOCK			
5	Yearlong	Yearlong		Provide for public safety, and reduce user conflict.

Alternative B proposes to change the Travel Restriction on only one trail. The Sleeping Child Divide trail #104, single-track, and its new additions would be changed from no restriction to TR3. Travel management and access determination for all other single-track trails in the project area is deferred to the Forest-wide Travel Planning project. Trails for OHVs < 50" in width would be restricted as noted in Table 3.1-3 above, Proposed New Trail Routes.

3.1.7 DESIGNED USE

The Designed Use for the new trail routes would be completed according to the All-Terrain Vehicle Design Parameters. Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from Design Parameter may be established based on trail specific conditions, topography, or other local factors, provided that the deviations are consistent with the general intent of the applicable Trail Class. Design Parameters are detailed in Table 3.1-4; all proposed new OHV < 50" in width would be Trail Class 3.

Table 3.1- 4: Design Parameters by Trail Class

Designed Use: All-Terrain Vehicle		**Trail Class 1**	**Trail Class 2**	**Trail Class 3**	**Trail Class 4**	**Trail Class 5**
Design Tread Width	Single Lane	Typically not designed or actively managed for OHV's, although use may be allowed.	48" - 60"	60"	60" – 72"	Typically not designed or actively managed for OHV's, although use may be allowed.
	Double Lane		96"	96" – 108"		
	Structures (minimal width)		60"			
Design Surface	Type		Native with limited grading. May be continuously rough. Sections of soft or unstable tread on grades > 5% maybe common and continuous.	Native with some onsite borrow or imported material where needed for stabilization and occasional grading. Intermittently rough. Sections of soft or unstable tread on grades< or = to 5% may be present.	Native with imported materials for tread stabilization likely and routine grading. Minor roughness. Sections of soft tread uncommon.	
	Protrusions		< or = to 6". May be common and continuous.	< or = to 3". May be common, but not continuous.	< or to 3". Uncommon and not continuous.	
	Obstacles		12"	6"	3"	

Designed Use: All-Terrain Vehicle		**Trail Class 1**	**Trail Class 2**	**Trail Class 3**	**Trail Class 4**	**Trail Class 5**
			May be common or placed for increased challenge	May be common and left for increased challenge.	Uncommon.	
Design Grade	Target Grade		10% - 25%	5% - 15%	3% - 10%	
	Short Pitch Maximum		35%	25%	15%	
	Maximum Pitch Density		20% - 40% of trail	15% - 30% of trail	10% - 20% of trail	
Design Cross Slope	Target Cross Slope		5% - 10%	3% - 8%	3% - 5%	
	Maximum Cross Slope		15%	10%	8%	
Design Clearing	Height		6’ - 7’	6’ – 8’	8’ – 10’	
	Width		60” Some light vegetation may encroach into clearing area.	60” – 72”	72” – 96”	
	Shoulder Clearance		0” – 6”	6” – 12”	12” – 18”	
Design Turn	Radius		6’ – 8’	8’ – 10’	8’ – 12’	

Implementation Costs

Costs to implement OHV trails on existing routes (proposed R-4 designation) has been estimated at $500 - $750 per mile depending on amount BMP structures required, such as waterbars, and clearing required on the trail tread. Maintenance of the trails would be dependent on use the trail receives and amount of annual clearing required. Maintenance would be less than costs to implement the trails, in most cases limited maintenance would be required on an annual basis and would be site specific. Single-track trail implementation is estimated at $250 - $350 since the trail tread currently exists and clearing required is minimal. Proposed connectors A, B, C, D, and H (1.8 miles total) will require minimal to no grading or earth moving to create a trail tread, these routes will primarily require clearing of downed wood, installation of water bars, keeping costs similar to maintenance activities. Proposed Connector G will require bench construction up to 0.2 mile. Cost to construct the Connector G may range up to $2,500 depending on amount of bench and difficulty of excavation.

The BNF will be working through partnership opportunities to complete BMP upgrades and implement the proposed connector routes in Alternative B. Individual routes will not be made available for motorized use until necessary BMP upgrades have been completed.

The Ravalli County Off-Road User Association (RCORUA) has been an organized group along with a Challenge Cost-Share Agreement with the Bitterroot National Forest since 2008. The detail in Table 3.1-5 describes their accomplishments between 2011 and 2014.

The group has been a big proponent towards creating more and better OHV trails in the Bitterroot valley.

They have committed time already in helping identify routes and connector trails in the Darby Lumber Lands that would benefit the user and the resource.

Table 3.1- 5: RCORUA Accomplishments

RCORUA Accomplishments in Hours				
Activity Type and Description	**2014**	**2013**	**2012**	**2011**
Forest Clean-Up; Trash Removal	162	353	168	113
Road and Trail Maintenance	507	245	192	379
Educational Activities	133	312	242	295
Forest Service Meetings/Process	30	40	38	86
Darby Lumber Project	20	0	0	268
Road and Trail Inventory	0	0	0	0
Signage Project	0	0	106	44
Total Hours	**852**	**950**	**746**	**1185**

Accomplishment Definitions:

- Trail maintenance activities included clearing obstructions (downed trees, rocks, and slides) from roads and trails for the benefit of all Forest visitors.
- Trash removal activities involved picking up trash along system roads, notably in the Gird and Rye Creek areas.
- Forest Service meetings included the time spent participating with the Resource Advisory and Bitterroot Forest Restoration Committees and participating in Forest Service plans and processes.
- Educational Activities include time spent with Forest personnel preparing and presenting a joint curriculum called “Ride the Right Trail” for responsible OHV Use to school children and participating in the Forest’s Conservation Days activities. This year the program was presented to 525 grade school children. Due to the dedication of volunteers and the Bitterroot National Forest OHV Ranger this program has garnered statewide attention. They have received numerous requests from other OHV groups to help them set up similar programs in their geographical areas. This project was supported with an RTP grant in 2014.

RCORUA has expressed interest in maintaining the proposed trails on a yearly basis. The group in the past has provided annual maintenance on the Jew Mountain, Overwhich, Bitterroot Divide, and Chain of Lakes

trails. Motorized companies such as Polaris and Honda have grants that could provide funds for trail construction and maintenance projects.

Currently the Bitterroot National Forest has a total of 1492 miles of trails; motorized use is allowed on 546.9 miles. Table 3.1-6 shows how motorized trails are administered on the Bitterroot National Forest.

Table 3.1- 6: Motorized Trails - Managed, Accepted, and Designed Use - miles

Motorized Trails	Motorcycle	OHV < 50"	Snowmobile
Managed	45.2	16.0	10.0
Accepted	430.9	4.8	23.0
Designed	0.0	28.0	85.0

Managed Use is defined as a mode of travel that is actively managed and appropriate on a trail, based on its design and management. Designed Use is defined as a trail that requires the most demanding design, construction, and maintenance parameters and that, in conjunction with the applicable Trail Class, determines which Design Parameters will apply to a trail. Accepted Use is other modes of travel legally allowed on a trail.

There is presently 28.0 miles of trail designed for All-Terrain Vehicles 50" or less on the Bitterroot National Forest, (Table 3.1-7).

The Forest Service would be adding 2.01 miles of All-Terrain Vehicle trails and 2.85 miles of Motorcycle trails to become a National Forest System trail, see Table 3.2 Proposed New Trail Routes**.** All new trails would have a Trail Management Objective (TMO) signed off by the District Ranger. These trails would be implemented into the Bitterroot National Forest 5 year maintenance rotation. Trail maintenance will be funded by federal funds, grants, and/or agreements.

Table 3.1- 7: Existing Trail Designed Use - All-Terrain Vehicles - Outside of the Darby Lumber Lands Project Area

Trail Number	Trail Name	Trail Mileage	Trail Class	Designed Use
674	Overwhich Creek	3.8	3	All-Terrain Vehicle
185	Jew Mountain	11.0	2	All-Terrain Vehicle
39	Chain of Lakes	6.8	2	All-Terrain Vehicle
248	Drop Creek	4.2	2	All-Terrain Vehicle
400	Capri Lake	0.6	2	All-Terrain Vehicle
332	Lakes Overlook	0.1	2	All-Terrain Vehicle
	Totals	**26.5**		

This opportunity of the proposed routes in the Darby Lumber Lands project would be similar to that of the Jew Mountain trail, it combines trail and seasonally closed road systems for OHV loop routes.

This proposal to allow OHV use in the Darby Lumber Lands area would be consistent with the Bitterroot Forest Plan. The direction of the Bitterroot National Forest is to manage for recreation activities associated with roads and motorized activities.

3.1.8 EFFECTS DISCUSSION

Under **Alternative A**, no additional motorized routes would be added with this project. No new proposed trails or connectors would occur, and no unauthorized routes would be designated with this alternative.

Those trail routes not originally designed to accommodate the type of motorized use now present would remain and continue to sustain erosion problems. Without road decommissioning and storage treatments, unauthorized use of closed roads would remain likely.

Under **Alternative B**, changes in travel management for existing routes and the implementation of the proposed new trails may affect the recreation experience of visitors in the project and surrounding area. Concern has been expressed that increasing motorized use near the Sleeping Child Inventoried Roadless Area (IRA) would affect those who are seeking primitive or non-motorized experiences in that area.

A. All Management Areas except MA 5

Recreation and trails direction for Forest Plan management areas is provided in PF-TRANS-001, the Travel Analysis process for the project area. All of the MAs in the project area provide for recreational motorized access, as long as resources are protected. Alternative B proposes a change in the mix of various road restrictions (R-codes) and decommissions (Table 2-2) or stores many currently closed roads to better protect certain resources (Chapter 1, Purpose and Need). Several roads currently open yearlong to all legal vehicles (unrestricted, or Open) are proposed to be restricted seasonally, closed or decommissioned. However, administrative and recreational motorized access to all areas currently open would be maintained, and improved in recently acquired sections. S1, T3N, R19W, which is surrounded by the IRA, currently has minimal motorized access (South Fork Sleeping Child trail #84 – single track), a situation that would be maintained with Alternative B. Several "loop" routes would provide an improved riding experience in both Sleeping Child and Rye Creek drainages for OHV < 50" users, but no unique or unusual destinations are made accessible by the proposed changes. R-code mileages in Table 2.5-1 suggests a slight reduction in winter wheeled access and associated recreational opportunity, but an increase in summer access for OHVs < 50" in width.

Non-motorized users to these areas tend to favor closed roads; these visitors would see fewer closed roads after Alternative B's proposed storage and decommissioning treatments. Many options for non-motorized or "walk-in" use would remain both within the project and surrounding area and this project is unlikely to produce more than minor effects to this type of recreational activity.

B. Management Area 5 - Sleeping Child IRA

Existing Condition

The Sleeping Child Inventoried Roadless Area encompasses the middle portion of Sleeping Child Creek, including Two Bear and Divide Creeks. About seven percent of the Roadless area burned during the Sleeping Child fire of 1961 and there are dozer lines throughout this portion of the landscape. Grazing occurs on approximately 1,500 acres and a cabin site is located in Coyote Meadows. About 35 miles of system trails are obvious to most users.

The headwaters and the lands below the Sleeping Child Inventoried Roadless area are roaded and developed for timber production. Within the Sleeping Child Roadless Area, 0.3 miles of road are open yearlong and 33.3 miles of trails are open yearlong to single track vehicles. There are 2.4 miles of motorized trail open seasonally to double track vehicles. In addition, the entire area is open to snow mobiles and mountain bikes can travel on 35.9 miles of trail.

This Roadless area has not been recommended for wilderness designation in the Forest Plan.

Roadless Characteristics

Natural Integrity: About 7% of the area in the southeast portion of the IRA burned in 1961 leaving numerous dozer lines. Grazing (139 animal unit months) occurs on approximately 1,500 acres. There is a

cabin site at Coyote Meadows. A total of six system trails, 35 miles in length are within or border the IRA. These trails are obvious to most users.

Apparent Naturalness: Most of the area appears natural, except for the portion in the southeast with the recovering dozer lines and logging roads. Trail 105, past the steep hill about one mile from NFSR 75 is beginning to be encroached upon by lodgepole pine growing into the trail. Ruts from past ATV use are visible on the steep hill.

Opportunity for Solitude-Remoteness: Outstanding opportunities for remoteness, away from others exist on weekdays during hunting season. Because the area is relatively small, and existing motorized use can occur on about 36 miles of trail, non-motorized solitude is best found where topographic breaks and vegetation screen the larger landscape and/or on weekends.

Opportunity for Primitive Recreation: The Roadless area provides ample opportunities for primitive recreation. Hiking, horseback riding, fishing, hunting, backcountry skiing and observing nature can be enjoyed. Users can feel a degree of challenge and risk because of light use, steep terrain, and remoteness. The area has loop trip opportunities, has the topography, and is large enough to provide challenge and risk for the motorcycle user. Approximately 2.4 miles is open to ATV's seasonally and approximately 35.9 miles of system trail are open to motorcycles. Opportunities exist for motorcycle users to experience a low concentration of other users in an area that appears predominantly natural, with a vastness of scale. Snowmobile opportunities exist on the east side above 7,000 feet in elevation.

Special Features: Special features include the meadows.

Environmental Consequences

Alternative A, No Action

The roadless characteristics would continue on the existing trend if the No Action Alternative were chosen. We expect that OHV's will continue to use the trails open to motorized use with Alternative A. OHV use on trails within and adjacent to the area may increase over time due to the seemingly increasing popularity of motorized OHV's that may alter roadless characteristics over time. These changes in roadless characteristics might include 1)being able to hear motorized vehicles recreating more often, 2)greater trail use and 3)the need for additional maintenance (may alter the primitive appearance of the trail) to maintain trail conditions and reduce or maintain the risk of erosion.

Natural Integrity and Apparent Naturalness would not change with Alternative A. Opportunity for Solitude-Remoteness, and Opportunity for Primitive Recreation may change slightly over time due to increased use. Recovery of vegetation following the fire and encroachment on the trail would continue. There would be no change in the existing trail system.

Alternative B, Final Proposed Action

The riding experience related to the trail continuity would see little real change as it has been in use for many years but Alternative B does propose to change the season of use for Sleeping Child Divide trail #104, to a hunting season restriction (October 15 through December 1) and add several existing segments to the to the forest trail system. The hunting season closure would reduce motorized use during hunting season and allow for less noise and disturbance of some IRA users and wildlife during the October 15- December 1 closure period. It is expected that snow would restrict motorized use in this area from December through mid-spring, which is similar to the existing condition for this time of year. This trail restriction may improve the feeling of remoteness of the Sleeping Child IRA to users during the hunting season.

Most of the Sleeping Child Divide Trail #104 addition is shown on the 1978 USGS Quad map for the area (Bald Top Mtn.) has been in constant use by motorcycles, hikers, and horse riders for decades and appears

to be stable and well-located. None of the TR104 additions would require construction as these sections are currently in place and being used. Alternative A assessment suggests that use of this trail would slowly increase over time. Alternative B Final Proposed Action there could be a greater increase of use by motorized recreationists. This could be due to the more frequent trail maintenance resulting in a trail accessible to a greater number of users or increased popularity of the area because of riding opportunities afforded by the nearby proposed trail connectors. Increased use adjacent to the roadless area would result in more motorized noise that may be heard within the roadless area. Where broad openings exist (either due to recent fire or natural openings), noise could travel further and reduce the remote experience of roadless area users to a greater degree than in more timbered areas. Since this is a qualitative measurement, the actual effect depends upon the individual user.

With Alternative B Final Proposed Action, Natural Integrity and Apparent Naturalness would not change to a measurable degree. The Opportunity for Solitude-Remoteness may have minor short-term indirect effects due to the potential for more use and accompanying sound from motorized vehicles. The Opportunity for Primitive Recreation for the motorized user would remain the same within the IRA but increase in the area adjacent to the IRA due to Connector B.

3.2 AQUATIC RESOURCES

3.2.1 INTRODUCTION

This section describes existing conditions of aquatic resources and the potential effects of alternatives A (No Action) and B (Final Proposed Action). The analysis is broken into the following components:

- Hydrologic Processes
- Aquatic Habitat and Water Quality
- Wetlands
- Fish Populations

3.2.2 INFORMATION SOURCES

All of the information described below is used together to define the condition of aquatic resources and to help predict how proposed activities may affect them. Throughout the analysis, peer reviewed scientific literature, field observations and data are used to support the assessment of existing conditions and to support predictions of project effects. Monitoring data and scientific literature is drawn from subject areas including fisheries science, forest hydrology, fluvial geomorphology, and aquatic ecology.

Much of the information used in this analysis is in the form of spatial data that is presented or analyzed using a Geographic Information System (GIS). Some of the key spatial data includes annual precipitation, elevations, geology, soils, watershed boundaries, roads, streams, and fish populations. Field information includes stream and fish population surveys, culvert assessments, and road surveys. One large database contains field data summarized in a 2014 PIBO report (USDA FOREST SERVICE 2014). Two of the PIBO sampling sites are within the within or downstream of the project area: one in Sleeping Child Creek and one in Rye Creek. These sites are be compared with managed and reference sites in areas with similar landscape and geomorphic characteristics factors.

The proposed project focuses primarily on road stabilization, travel management and trail construction. Sediment that is derived from these erosive surfaces is the primary concern and the focus of this analysis. Sediment in streams can degrade macro-invertebrate and aquatic habitat by filling interstitial spaces and pools, and decrease inter-gravel dissolved oxygen concentrations; both of which impact the aquatic ecosystem (MacDonald, et al. 1991; Meehan 1991).

3.2.3 METHODS

Reviewing road data on a watershed scale provides insight into how hydrologic processes have been altered. Road location and condition information is used to evaluate the differences between the alternatives. Monitoring data and scientific literature are used extensively to draw inference on the hydrologic processes of infiltration, erosion and flow timing and how management activities may affect them.

Conditions discussed in the Purpose and Need (Section 1.5) support the need to reduce road-related aquatic effects within the three project area watersheds. To best display potential effects, aquatics assessment methods focus on the area considered to be the most likely to contribute sediment and impair water quality and aquatic habitat. The area within 100 feet of streams and road/stream crossings were selected as indicators of fine sediment and nutrient loading after considering the MDEQ TMDL (2011) water quality assessment, pertinent literature and field conditions (Figure 3.2-1). The TMDL water quality assessment considered a wide variety of native road conditions, surfaces, designs and use levels, and the data used is assumed to represent all current and potential future road conditions and use levels within the project area. All activities were also screened to determine possible conflicts with the INFISH Forest Plan Amendment.

3.2.4 ANALYSIS AREA

A. Spatial Bounds for Direct, Indirect, and Cumulative Effects

Figure 3.2-2 displays the analysis areas for this section of the Darby Lumber Lands Watershed Improvement and Travel Management Project ("project"). It includes the project area, the primary analysis area, and the cumulative effects analysis area. Three 6th-level watershed boundaries are used as the primary analysis area. This area was chosen because watersheds are natural boundaries for effects on water resources, activities are concentrated within these boundaries, and the effects would be most evident at that scale.

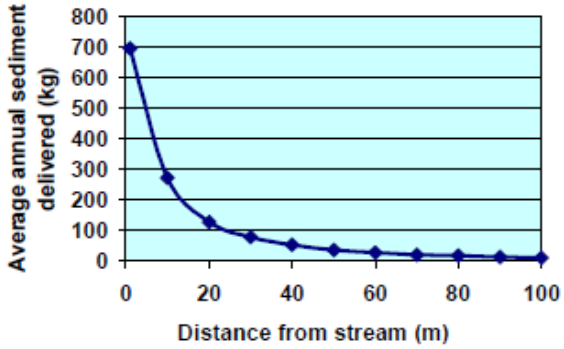

Figure 3.2- 1: Annual sediment yield from roads to streams (Elliot, Foltz, and Robichaud, draft 2000). Beyond 30m (approximately 100 feet) the change in the amount of delivered sediment becomes relatively small.

Cumulative effects focus on the 6th-level watershed scale and a larger scale that includes downstream effects and a segment of the Bitterroot River that ties the Sleeping Child and Rye watersheds together. The indicator is presented at the 6th-level watershed scale, for those watersheds that could be affected by project activities. Each component of the analysis describes the scale used for analysis of the effects.

B. Temporal Bounds for Direct, Indirect, and Cumulative Effects

Temporal bounds for aquatic resources are short-term (from 1- 3 years) or long-term (3 years or more). These are based on durations of effects observed in similar projects.

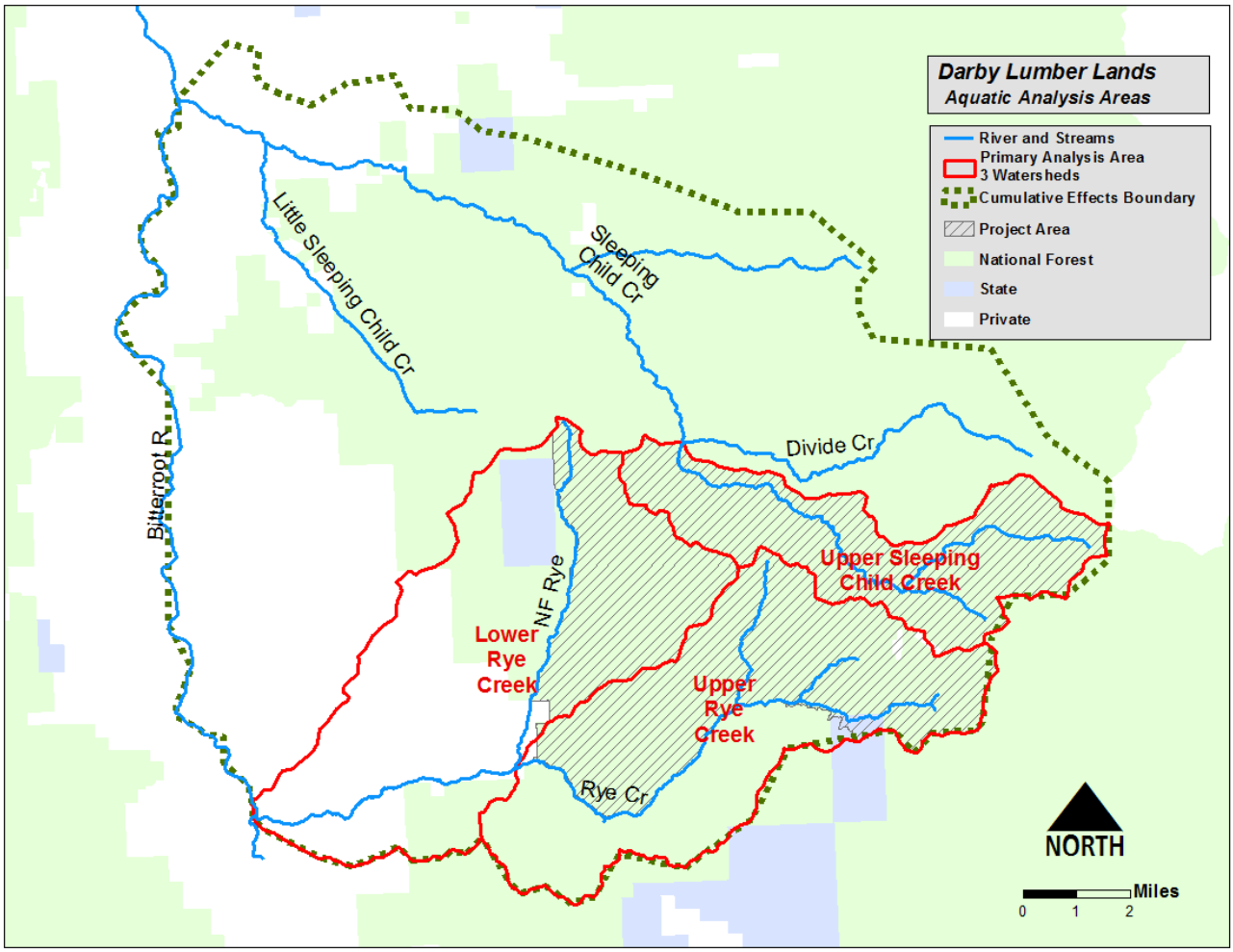

Figure 3.2- 2: Analysis Areas for the Project's Aquatic Resources Analysis.

3.2.5 AFFECTED ENVIRONMENT AND EXISTING CONDITION

The project lies within the Sapphire Mountain Range of western Montana. Average annual precipitation varies from about 14 inches near the Forest Boundary to about 35 inches at the upper elevations near Kent Peak. The percent of the average annual precipitation that falls as snow varies from 40 percent to about 60 percent. Rainfall intensity tends to be moderate, but intense thunderstorms may occur. Most erosion is driven by periods of rapid snowmelt or high-intensity rainfall associated with thunderstorms, but lower-intensity storms may also cause erosion if the duration is sufficient to saturate surface soils.

Stream channels in the project area are typically fairly steep with narrow channels (Channel types A2, A3, B2, B3 and B4, Rosgen 1996) with fair to good streambank stability (Pfankuch 1975, Stream Reach Inventory and Channel Stability Evaluation, USFS, R1). Stream composition is generally gravel/cobble with some lower gradient, finer textured depositional sections on the larger streams and downstream of the analysis area (Rye and Sleeping Child Creeks).

Idaho batholith granite dominates assessment area geology, with a smaller area of Belt Series calc-silicates near the Sapphire range divide. The erosion characteristics of project area soils are detailed in the assessment's Soils section (Section 3.8). The project area soils are mainly derived from granite and are easily eroded when disturbed or not fully vegetated. These characteristics make road systems built on them more difficult to manage and maintain, and create a higher risk of erosion and negative aquatic

effects. Table 3.2-1 displays the watershed HUCs, areas and road densities, all three of which are amongst the highest 10 watershed road densities on the Forest.

Table 3.2- 1: Project Area Watersheds

6th-level Watershed Name	HUC	USFS Area (sq. mi.)	Total Road Density (mi./sq. mi.)
Upper Sleeping Child Creek	170102050702	15.4	4.8
Upper Rye Creek	170102050801	27.8	6.3
Lower Rye Creek	170102050801	18.4	7.3

A. Hydrologic Processes

The 2000 wildfires burned over most of the project area, with varying results. In the DLL sections (Figure 1-2), heavy slash from recent logging increased burn severity. The loss of organic layers, herbaceous plants, and woody debris changed the hydrologic response of much of the area. After the fire, there was less infiltration, flashier runoff, more widespread surface flow and more erosion. This occurred on Forest Service sections as well, but usually to a somewhat lesser degree due to less fuel on the ground. Those areas (particularly the acquired DLL sections) with high burn severity have recovered more slowly, and still show more bare soil and less plant cover (EA Cover Photo). These sites are more prone to surface flow, erosion and sediment generation than more heavily vegetated sites.

Post-fire hydrology accelerated erosion on the landscapes and road systems. Thunderstorms in 2001 and 2002 created a sizeable sediment *pulse* in all three 6th-level watersheds. With vegetation recovery, this sediment contribution has decreased substantially. Where burn severity was high and recovery slow, post-fire effects and elevated sediment production still linger. Road systems, due to their compaction and more persistent disturbed condition, are prone to producing sediment during relatively small precipitation or melt events on a regular basis, also known as *chronic* sediment. Although chronic effects are generally low-to-moderate in magnitude, they occur with moderate-to-high frequency. In contrast to pulse effects, chronic effects may not allow for significant recovery of the soil and water resource between events, and therefore may degrade the resource over the longer term.

The road system on the acquired lands was particularly sensitive to post-fire hydrology. Lack of functioning drainage systems, most notably effective road cross-drains and undersized culverts, produced severe, widespread road damage, most notably in Section 1, T 3N, R 19 W (Figure 1-1). Soils in the area are highly erodible, adding to the problem and increasing sediment effects in local streams (Aquatic Habitat and Water Quality, below). Currently, much of the burned areas are still experiencing increased surface flow and erosion from the extensive, poorly maintained road system. Please see discussion in the Cumulative Effects section for issues associated with chronic sediment.

B. Aquatic Habitat and Water Quality

To address water quality and aquatic habitat, information is drawn from stream and habitat data such as aquatic habitat inventories, fish population monitoring, water quality-related monitoring by MDEQ and the Forest Service's Watershed Condition Framework ("WCF", USDA 2011). Field observations by staff and stakeholders are also included. The 6th-level watershed boundaries for upper Sleeping Child, upper and lower Rye Creek were assessed for aquatic habitat and water quality. Figure 3.2-2 displays both the three watershed assessment area and the proposed project area boundary, which includes a smaller area.

Aquatic habitat and water quality in forested catchments is primarily a function of stream channel condition, riparian health, and sediment delivery. The sediment within the assessment area comes from both natural events and management-related sources. Management-related sediment sources are the primary focus of this assessment and analysis, as they have been noted as the main long-term factor degrading aquatic habitat and water quality in project area watersheds (MDEQ 2011, MDEQ 2014).

The state-designated water quality beneficial use classification within the project area is B-1. B-1 waters are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. Three of the major streams (Sleeping Child, North Fork Rye and Rye Creeks) within the assessment and project area are currently listed as not supporting the designated aquatic life beneficial. Forest roads are listed as problem sources in all three stream listings. PF- AQUATICS-003 displays details of the water quality listings for Sleeping Child, North Fork Rye and Rye Creeks.

The WCF is an integrated rating of watershed condition (USDA 2011). Overall ratings are determined by compiling weighted watershed metrics such as road density, DEQ water quality impairment listings, and several other known influences on watershed condition. The three 6th-level watersheds in the project area were all rated as "Functioning – At Risk", and all three were in the top 10 for road density on the BNF. Due to the condition ratings and road system contributions to the ratings, Upper Sleeping Child and Rye Creeks (including the North Fork) are considered top priority watersheds for restoration.

The number of road/stream crossings is an important indicator of potential sedimentation because sediment can enter the stream network directly at these locations. Stream crossing density (crossings/square mile) has been correlated with elevated fine sediment in streams (Schnackenberg and MacDonald 1998). Roads and related features such as culvert blowouts (Figure 1-1) are a main sediment source in the project area. Crossing numbers and density for the assessment area, along with an estimate of crossing-related sediment, are displayed in Table 3.2-2.

Table 3.2- 2: Stream Crossings and Estimated Sediment for Assessment Area Watersheds

6th –level Watershed Name	USFS - Area (sq. mi.)	Road/Stream Crossings	Road/Stream Crossing Density (#/sq. mi.)	Road Crossing Sediment Load (tons/yr.)
Upper Rye Creek	27.8	121	4.4	14.5
Lower Rye Creek	18.4	90	4.9	10.8
Rye Creek Totals	**46.2**	**211**	**4.5**	**25.3**
Upper Sleeping Child Creek	15.4	62	4.0	7.4
Assessment Area Totals	**61.6**	**273**	**4.4**	**32.7**

Table 3.2-3 displays miles of road considered to be within sediment-contributing distance of streams.

Table 3.2- 3: Miles of Road within Sediment-contributing Distance of Streams

6th –level Watershed Name	Miles of Road within 100ft of Streams	Parallel road sediment Load (tons/yr.)	Total road sediment (Crossings plus roads within 100') (tons/yr.)
Upper Rye Creek	16.5	36.6	51.1
Lower Rye Creek	14.5	32.1	42.9
Rye Creek Totals	**31.1**	**68.7**	**94.0**
Upper Sleeping Child Creek	6.2	13.6	21.0
Project Area Totals	**37.2**	**82.3**	**115.0**

Historic logging practices caused sedimentation in the past, most notably through road building near streams and stream crossing construction. Reduced timber sale volume and changes in harvest practices based on the SMZ law (1985), BMP program (1983) and INFISH Forest Plan Amendment (1994) have incrementally reduced harvest and road building impacts to streams. Timber harvest practices on NFS lands have left riparian habitat conservation areas (RHCA's) essentially un-harvested since 1994. Retention of riparian vegetation has been found successful in trapping overland sediments before they reach stream channels (USDA Forest Service 1995).

Much of the project area was formerly private land which experienced intensive road construction and logging from the 1970's up to the late 1990's before completion of the DLL land exchange. After the 2000 fires, the Bitterroot National Forest harvested various timber salvage units in the middle elevations of the watersheds using a selective prescription. The last Forest Service sale in the assessment area closed in 2004, in the Rye Creek 6th-level watershed. Existing road densities in the assessment area watersheds are displayed in Table 3.2-1.

The BNF has completed several activities to reduce sediment in Rye Creek: Road drainage and surface upgrades ("BMP upgrades") on streamside roads FR75, 321, 311, and 5745. The BNF also implemented a large road-decommissioning project (Crystal Mountain I and II) during 2005 and 2006 in upper Rye Creek south of the Crystal Mine, as part of the 2001 Burned Area Restoration ("BAR") project.

C. Wetlands

Wetlands within the project area are limited to beaver ponds, streamside areas and small seeps and springs. These water features have been formally protected since the creation of the Montana Streamside Management Zone (SMZ) Act, BMP program and INFISH Forest Plan Amendment. Some wetland areas, most notably those within swales and channels, have been negatively affected by road-related sediment generation. Most streambank riparian areas not impacted by roads are considered in good shape, as grazing is limited to wildlife or natural levels. While all water resources in the assessment area watersheds are important, none are considered unique for the area or the Bitterroot River watershed.

3.2.6 FISH AND AQUATIC HABITAT

A. Overview of Habitat and Population Conditions

Generally, native fish in the analysis area are struggling to persist. The most influential factors that influence the aquatic species and habitats in the analysis area are:

- Competition, predation, and hybridization with non-native brook, brown, and rainbow trout
- Seasonal dewatering of lower Rye Creek and the Bitterroot River for irrigation
- Removal of fish from streams and the Bitterroot River into irrigation ditches
- Barriers to fish movement in lower Rye Creek and lower Sleeping Child Creek.
- Erosion (sediment) and channel confinement and other impacts from the existing road system
- Streambank instability along lower Rye Creek and lower Sleeping Child Creek (development related)
- Dispersed recreation and firewood collection along creeks
- Seasonally, the mainstem Bitterroot River as well as the lower reaches of many tributaries are unsuitably warm for native trout.

This project primarily addresses effects of the existing road system .

B. Aquatic Habitat

At a broad scale, the major fish-bearing streams (Sleeping Child, Rye and North Fork Rye creeks) on private lands are lower gradient with higher amounts of fine particle in the substrate (Carlson 2004). On the Forest portions of the analysis area the streams tend to be steeper, more confined and have larger substrate (Rosgen 1998). Although, the channel type provides some indication of the potential of a stream, the quality of the habitat is critical to maintain a productive fishery. Good quality native fish habitat is: cold, clean, connected, and complex. These attributes have been dubbed the 4 Cs of native fish habitat (Montana DNRC 2005). The 4 Cs of native trout habitat provide a solid basis for evaluating the effects of projects on native fish. The 4 Cs are defined below, and the existing conditions relative to the 4 Cs follow.

- Native fish need cold water. Projects that affect the amount of shade along streams or the amount of water in streams can affect native fish.
- Native fish require clean waters and substrates, particularly for rearing and spawning.
- Habitat that is connected at multiple scales (ranging from very small streams to large rivers) is important to allow distribution of populations and access to habitats for various life stages.
- Habitat complexity provides space for many aquatic species and their life stages. In this project area habitat complexity is related to the amount of large wood that accumulates in channels and floodplains. Habitat complexity in this area is also related to maintaining the natural variability in channel types and floodplains.

C. Stream Temperatures (Cold)

Cold water is a key factor related to the health and survival of native trout, especially bull trout. Bull trout are most common in streams that rarely exceed 55^{o}F (13^{o}C). Westslope cutthroat are most common in streams that rarely exceed 59^{o}F (15^{o}C) (Isaak 2014). Mortality of angler released trout is commonly observed when river temperatures exceed 70^{o}F (21^{o}C) (C. Clancy, personal communication 2014).

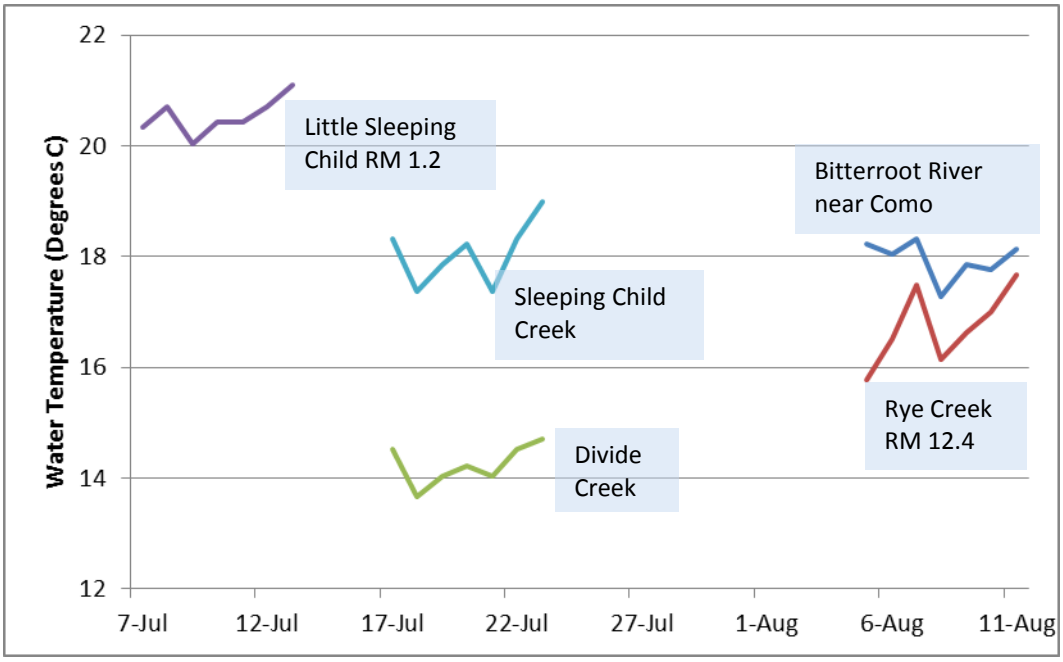

Figure 3.2- 3: Daily High Temperatures at Five Locations in the Darby Lumber lands Fisheries Analysis Area

Figure 3.2-3 displays the warmest water temperatures for one point in five streams in the fisheries analysis area. It is calculated as seven consecutive-day moving average of daily maximum temperature in 2014.

Little Sleeping Child is not in the project area, but is within the fisheries analysis area, and the data adds a point of reference. The point measured in this stream is near the downstream-most BNF property. The stream reaches temperatures that can be lethal for native trout (>20^{o}C). The reason for the relatively early season warming of Little Sleeping Child Creek is unknown, but could be related to water management at two small private dams upstream.

Rye Creek, near the junctions of NFSR #75 and NFSR #5607 appears to relatively hospitable for cutthroat and maybe even bull trout. However, 2013 data for the same point in Rye Creek (not shown in the Figure 3-3) revealed temperatures similar to Little Sleeping Child Creek. Those temperatures would impact growth and survival of native trout.

Stream temperatures at Divide and Sleeping Child creeks were collected near the junction of these creeks, at the same elevation. Divide Creek is substantially cooler. The reason for the difference is not clear, but stream aspect or the amount of area burned in the 2000 fire may be significant factors. Aspect and a lack of streamside vegetation both reduce shade and increase the amount of solar radiation that reaches the streams. Sleeping Child Creek, upstream of the data logger, flows south to north; and Divide Creek runs east to west. Although Divide Creek is not in the project area, it is a tributary to Sleeping Child Creek. It is also interesting because Divide Creek temperatures are much more suitable to native trout, particularly bull trout. Cutthroat are abundant, and bull trout are common, in both of these stream segments, but bull trout are more plentiful in the cooler Divide Creek.

The Bitterroot River in the area of Lake Como is known to reach temperatures that impact the survival of cutthroat trout. In 2013 the river was closed to angling during the warmest parts of the day to protect trout. Heat related stress is increased when trout are captured by anglers. In 2014, the river remained open to angling because of the cooler and wetter summer.

The removal of forest cover in road right-of-ways can increase solar radiation and wind penetration into the riparian zone, resulting in changes in riparian microclimate and stream temperature (Moore et al. 2005). In this regard Rye, North Fork Rye and Sleeping Child creeks have extensive lengths of road that closely parallel these streams. There are also many road crossings per mile in parts of these drainages.

D. Fine Sediment (Clean)

Accumulations of fine sediment have been an issue in Sleeping Child and Rye Creek for a few decades. The PIBO "fines index" found the sites in the analysis area were similar to other managed sites in the BNF, but there are more fines than reference (minimally managed) sites (USDA Forest Service 2014). Lower gradient reaches of these streams are especially prone to retaining these fine sediments. In July of 2001, Sleeping Child experienced several debris torrents that deposited massive amounts of fine and coarse sediment in the stream. This was an extreme post 2000 Fire pulse event (defined above). Rye Creek also experience small, but still sizeable post fire events.

In addition to the pulse events both drainages are prone to chronic inputs of fine sediment from roads. These chronic sources inhibit recovery of fish and aquatic animals.

Increased sediment loads alter a stream's natural biotic community (algae, macrophytes, invertebrates, and fishes).

- Sedimentation has been shown to be a major factor in the habitat loss for mussels.
- Stream bottom composition is a primary factor influencing aquatic insect abundance and distribution. Aquatic macroinvertebrates are adversely affected by reducing the efficiency of certain feeding activities especially filter feeding and grazing.
- Deposited sediments affect fish directly by smothering eggs in redds, altering spawning habitat, and reducing overwintering habitat for fry, and, indirectly by altering invertebrate species composition, thereby decreasing abundance of preferred prey.

E. Habitat Complexity

Large wood is a measure of habitat complexity and quality. Wood frequency index values for both Rye and Sleeping Child sites were high (good) compared reference sites (USDA Forest Service 2014). The future supplies for large wood (large trees growing near the stream) over the next few decades is variable. The supply pattern is influenced by the pattern of high severity wildfire, the proximity of roads to streams, and the pattern of illegal removing of trees from the streamside zone.

Pool frequency and residual pool depth are two other measures of habitat quality. Index values for both Rye and Sleeping Child sites were very close to those of reference sites (USDA Forest Service 2014). These factors are often a result of the amount of wood or other features that provide habitat complexity.

F. Habitat Connectivity

There are barriers to the upstream movement of trout from the Bitterroot River into Sleeping Child and Rye Creek. The barriers may not completely block all fish during all seasons, but they block most fish during most seasons. There are also barriers within the drainages. Most of the man-made barriers are at road crossings. Many culverts within the BNF have been upgraded in the last 20 years. These upgrades were designed to allow aquatic organisms to pass through them, and to pass water and debris during a 100-year flood event.

There are at least three road-related barriers within cutthroat habitats in Sleeping Child Creek and four in the North Fork of Rye Creek. Those in the North Fork of Rye Creek are not in the project area. Planning for

these projects is ongoing: NEPA documentation was done in 2010, designs are needed, and implementation is pending according to the Forest's prioritized list.

During summer there are also barriers created in Rye Creek by reducing stream flow to low levels. Streamflow gets so low, and stream temperatures so high, in some summers that most native fish are unlikely to survive within them or be able to pass through them without becoming stranded.

G. Fish Populations

Bull trout are currently present in Sleeping Child Creek and some its larger tributaries. Bull trout are absent from Rye Creek and North Fork Rye Creek (MT FWP 2014). Bull trout were present at very low numbers in Rye Creek prior to the 2000 Fire.

Westslope cutthroat trout are common in the larger streams throughout the project and analysis areas. Genetic testing from the 1980s and 90s determined that they are genetically pure. Genetic purity in the Bitterroot River is variable. Most of the cutthroat trout in the river are hybridized with rainbow trout.

The ecologically and socially valuable large-bodied migratory form of both native trout species is practically absent from the project area, and there are probably very few that reside in the river near the project area. The migratory native trout are far below their historical levels (USDA Forest Service 2013).

Surveys have confirmed the presence of native Western pearlshell mussels in the analysis area, but not in the smaller project area. These mussels are listed as sensitive by the Forest Service (Region 1, Regional Forester, USDA Forest Service). The mussels are located in the Sleeping Child Drainage in the lower gradient areas on BNF and private land. The individuals within the population appear to be reproducing because there are several sizes of these long-live mussels. Their known distribution in Sleeping Child drainage is patchy and limited to approximately 3 miles of stream. The literature suggests the species prefers habitat that has less fine sediment than is found where these mussels are present.

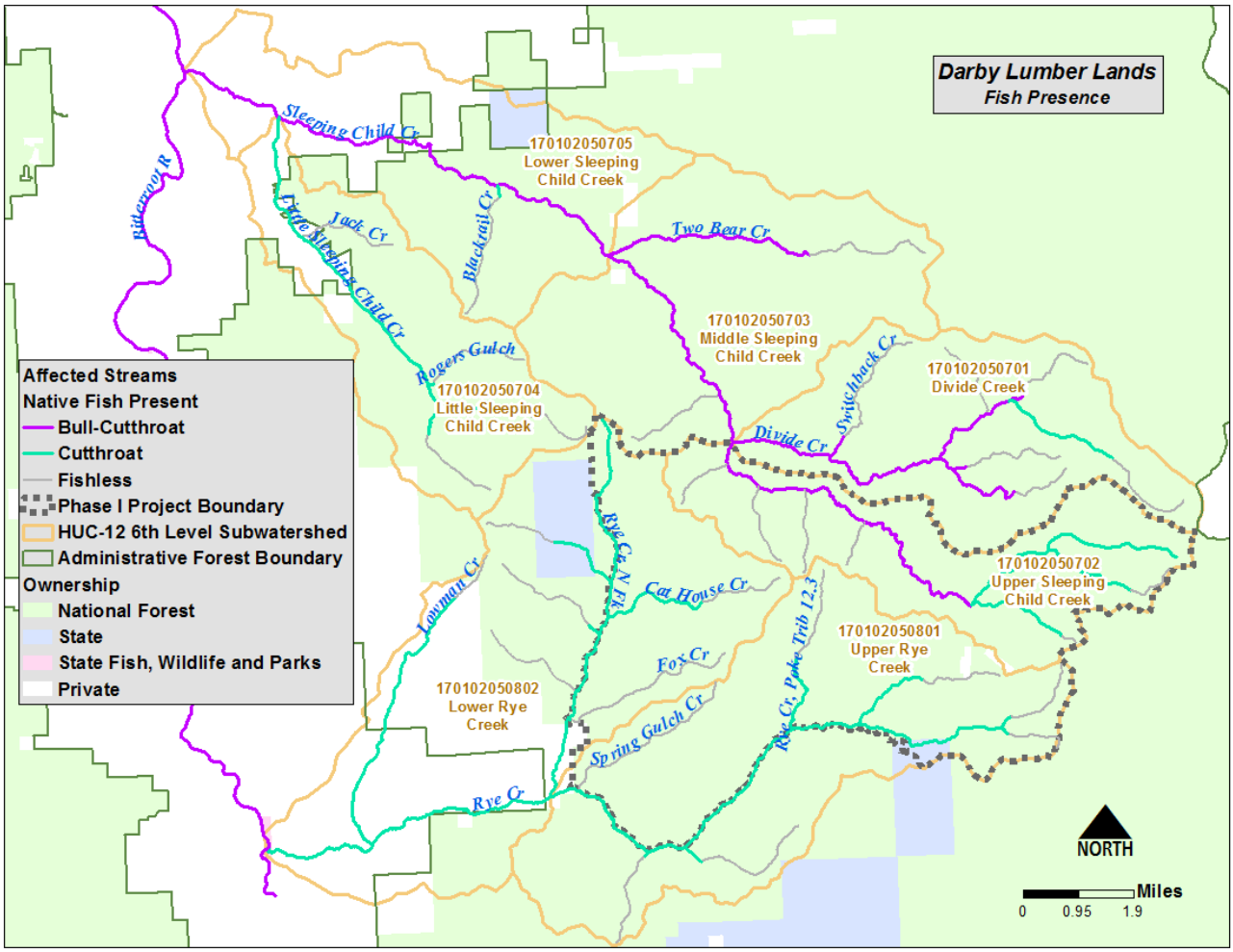

Figure 3.2- 4: Native Trout Distribution within the Analysis Area

3.2.7 ENVIRONMENTAL CONSEQUENCES

Proposed activities of the action alternatives that have the potential to affect aquatic resources are summarized in Table 2.5-1. These proposed activities are the focus of the following aquatics analysis.

A. Direct, Indirect, and Cumulative Effects of Alternative A (No Action)

In the No-Action Alternative, the current environmental situation and resource conditions described in the *Affected Environment* section above would persist, and possibly worsen. Road treatments designed to reduce sediment or improve beneficial use achievement would not occur, and native fish populations would remain at risk. As these road systems continue to age, culvert failure, road drainage feature (BMP) failure, road surface rutting and sediment generation would continue for the long term. Post-fire vegetation recovery would continue, slowly changing hydrology as the forest continues to mature.

The sediment pulse associated with pulling culverts would not occur, but chronic sediment from the existing crossings would continue for the long term. Without stabilizing deteriorating roads, cumulative effects for aquatic resources would vary, as culvert failures are somewhat unpredictable. Sediment pulses associated with failures would move downstream, and in combination with other existing sediment sources, may adversely affect fish habitat and water quality.

Overall, Alternative A would not create the desired net reduction in sediment noted in the Purpose and Need. There is a substantial risk that Alternative A would allow aquatic resources to degrade below the conditions described in the Affected Environment discussion, as the road system continues to deteriorate.

B. Direct and Indirect Effects of Alternatives B (Final Proposed Action)

Direct and indirect effects of the action alternatives are discussed below in terms of hydrologic processes, aquatic habitat, water quality, wetlands, and fish populations. The spatial and temporal scales of predicted effects are described by each component of the analysis.

Hydrologic Processes

Road storage and decommissioning both have similar conservation goals, treatments and effects. The stream crossings removed in both treatments was considered beneficial in the sediment effects. Table 3.2-4 accounts for Alternative B's changes in road/stream crossings and related sediment. These measures show substantial management-related chronic fine sediment reductions in the all three of the 6th-level watersheds, ranging from 26% to 70%.

Road decommissioning and storage treatments of Alternative B would also improve water infiltration and drainage, further reducing the effects of the overall road system on hydrologic processes, most importantly within sediment-contributing distance of streams. Table 3.2-5 shows potential reductions in sediment from roads within contributing distance after treatments proposed in Alternative B.

With reduced surface flow on decommissioned and stored road segments, those formerly compacted road surfaces within sediment-contributing distance would stabilize, and with associated seed and mulch treatments, cease to be chronic fine sediment sources. All treated areas both inside and outside of sediment-contributing distance (estimated at approximately 100') would stabilize and become productive growing sites and grow forest cover over the long term.

Aquatic Habitat and Water Quality

The alternative would reduce long-term (3 or more years) sediment levels, at both the stream reach and 6th-level watershed scales. Some proposed activities have the potential to cause short-term (1 to 3 years) sediment delivery into Sleeping Child and Rye Creek stream networks. These include stream crossing culvert removal and re-contouring near streams.

Design features (Table 2-2) apply to all ground-disturbing project activities listed below. Similar to standard BMPs applied to road location and construction, they do not totally eliminate sediment from activities, but reduce effects to the greatest feasible extent.

Stream crossing culvert removal and associated slope recontouring – Culvert removal typically increases sediment over the short term (1-3 years). This pulse generally is limited to immediately after the pipe is pulled (approximately 24 hours) (Jakober 2002), after which sediment returns to pre-disturbance levels. Additional pulses occur during high flows for the next 2-3 years as the channel margins adjust within the former culvert site and vegetation is established. By year 3, vegetation and channel shape are re-established, and sediment delivery from the site generally drops below that prior to the road treatment. In the long term, it is probable that this action could prevent catastrophic failures of old, undersized or poorly designed culverts which could potentially double or triple the annual amount of sediment delivery. Multiple culvert failures are currently producing accelerated sediment delivery on the acquired lands within the aquatics assessment area (Figure 1.2), and many more are apt to fail over time as culverts plug or rust out. For example, the erosion associated with the four S1, R3N, R19W culvert failures were estimated at about 200 cubic yards per failure (75 feet average length, 15 feet average width and 5 feet average depth/27 cubic feet per cubic yard = 208 cubic yards), for a total of over 800 cubic yards or 1,800 tons.

Culvert removal sites become aquatic habitat as the channels stabilize, and stream banks become vegetated. The amount of new or restored habitat would be the same as the culvert length, approximately 50 – 100 feet for most stream crossing sites. With over 100 crossings being rehabilitated, about 2.8 miles of stream bank riparian area would be restored to functioning condition. Aquatic habitat downstream of former sediment-contributing sites, such as road crossings, would improve as decreases in fine sediment allow channels to recover to more natural sediment regimes.

Road and trail use - Road and trail use generates sediment by disturbing and loosening soil at road/stream crossings and other sites within sediment-contributing distance. The loose soil is then-available for transport by surface flow. Surface flow occurs regularly on the compacted surfaces of trails and roads, making those trails and roads within sediment-contributing distance chronic fine sediment sources.

While several closed roads are proposed to be opened for motorized use, the net reduction in road-related sediment would improve aquatic habitat and water quality in the mid and long term. Table 3.2-4 displays the estimated net reduction in road/stream crossings and road segments due to implementing Alternative B. Table 3.2-5 displays the amount of road within sediment contributing distance of streams and related sediment, along with the total resulting from adding in the crossing sediment, using MDEQ sedimentation rate estimates (MDEQ 2011). Table 3.2-5 also displays the net percent change in sediment resulting from implementing Alternative B.

This comparison of the alternatives (Tables 3.2-4 and 3.2-5) suggests sediment, and therefore adverse water quality and aquatic habitat effects from the road system would be substantially reduced by Alternative B. Table 3.2-5 displays the estimated change in overall sediment on a tons/year and percentage decrease in the annual sediment contribution from roads within the assessment area.

Table 3.2- 4: Stream Crossings and Estimated Sediment for Assessment Area Watersheds, Final Proposed Action

6th –level Watershed Name	Road/Stream Crossings			Road/Stream Crossing Density (#/sq. mi.)			Road Crossing Sediment Load (tons/yr.)		
	No Action	Final Proposed Action	% Change	No Action	Final Proposed Action	% Change	No Action	Final Proposed Action	% Change
Upper Rye Creek	121	83	-32%	4.4	3.0	-32%	14.5	10.0	-31%
Lower Rye Creek	90	58	-36%	4.9	3.2	-35%	10.8	7.0	-35%
Rye Creek Totals	**211**	**141**	**-33%**	**4.5**	**3.1**	**-31%**	**25.3**	**17.0**	**-33%**
Upper Sleeping Child Creek	62	19	-69%	4.0	1.2	-70%	7.4	2.3	-70%
Project Area Totals	**273**	**160**	**-41%**	**4.4**	**2.6**	**-41%**	**32.7**	**19.3**	**-41%**

Table 3.2- 5: Estimated Tons of Sediment per Year Produced from Road Segments within Sediment-contributing Distance and Road Crossings, Final Proposed Action (Alternative B)

6th –level Watershed Name	Road within 100 ft of Streams (miles)			Roads within 100 ft sediment Load (tons/yrs.)			Total road sediment (Crossings plus roads within 100') (tons/yrs.)		
	No Action	Final Proposed Action	% Change	No Action	Final Proposed Action	% Change	No Action	Final Proposed Action	% Change
Upper Rye Creek	16.5	10.4	-37%	36.6	22.9	-37%	51.1	32.9	-36%
Lower Rye Creek	14.5	8.6	-41%	32.1	18.9	-41%	42.9	25.9	-39%
Rye Creek Totals	**31.1**	**19.0**	**-39%**	**68.7**	**41.8**	**-39%**	**94.0**	**58.8**	**-37%**
Upper Sleeping Child Creek	6.2	1.9	-69%	13.6	4.2	-69%	21.0	6.5	-69%
Project Area Totals	**37.2**	**20.9**	**-44%**	**82.3**	**46.0**	**-44%**	**115.0**	**65.30**	**-43%**

Another assessment tool for road-related watershed effects is road density. Alternative B would reduce total road density (includes R-1 closed but not stored roads) and open road density in Upper and Lower Rye Creek (Table 3.2-5). Total road density would decrease substantially in Upper Sleeping Child watershed with the decommissioning of all Section 1 roads, and open road density would increase by 0.1 mi./sq. mi. with the proposed opening of Connector B and portions of FR73919, FR73920, FR73921 and FR73926 (Project File Documents PF-MAP-001, PF-MAP-004, and Appendix A, Tables 1 and 4).

Table 3.2- 6: Project Area Total Road Density by 6th-level Watershed – and Final Proposed Action (Alternative B)

6th-level Watershed Name	Existing Total Road Density (mi./sq. mi.)	Alternative B Total Road Density (mi/sq. mi.	Existing Open Road Density (mi./sq. mi.)	Alternative B Open Road Density (mi/sq. mi.
Upper Sleeping Child Creek	4.8	1.6	1.5	1.6
Upper Rye Creek	6.3	3.3	3.2	2.9
Lower Rye Creek	7.3	3.8	4.2	3.6

Some proposed activities are unlikely to create enough sediment to affect aquatic habitat or water quality. These include most connector trail construction, the specified road construction around the Crystal Mine, and the aspen thinning treatments.

Connector trail construction – PF MAP-004 displays the location of proposed connector trails. Table 3.1-2, Proposed New Trail Routes, in Chapter 3, Trails section, describes each connector, including length, type, design vehicle and construction needs. Connector trail locations were carefully chosen to avoid drainages, stream channels, wetlands or other water features. Additionally, due to the design vehicle capabilities (OHV's < 50 inches in width, motorcycles), minimal soil disturbance is needed to meet USFS trail standards (Table 3.1-4, Design Parameters by Vehicle Class). The only connector that will need substantial grading would be Connector G,) which would be a side-hill route that needs full-bench construction to meet USFS trail specifications. These graded areas are located outside of sediment-contributing distance (estimated at 100') from the closest stream, and eroded material from this site is unlikely to reach a channel. All connectors would be built according to the standards and BMPs listed in Table 2-2, minimizing erosion and sediment potential. The additions to TR104 would not need construction, as they already exist in an appropriate location. For these reasons, further assessment of aquatic effects for the proposed connector trails is not warranted.

Specified Road Construction – PF MAP-004 displays the location of the Crystal Mine bypass, a new system road segment 0.4 miles long proposed to connect FR715 (Mine Road) around private property where access has been limited for several years. The proposed route was surveyed and located by watershed program staff and traverses a forested, upland site near the Rye Creek/Sleeping Child divide. No new stream crossing structures are needed, and the road does not approach within sediment-contributing distance of streams or wetlands. For these reasons, further assessment of aquatic effects for the Crystal Mine Bypass is not warranted.

Aspen Thinning - Non-commercial thinning is proposed within two aspen clones; this activity does not disturb the ground. has no erosion potential, and is not adjacent to stream channels. Thinning would be accomplished by hand crews with chain saws and there is no proposed prescribed fire after thinning. For these reasons, further assessment of aquatic effects for aspen thinning is not warranted.

Overall, assessment results suggest the Final Proposed Action would produce a net reduction in road-related sediment production. Long-term sediment from motorized trail use in the Upper Sleeping Child watershed is unlikely to change due to Alternative B; the amount of trail designated for motorized use varies only slightly, with the proposed additions to TR104 being far from streams and unlikely to add to sedimentation rates. Alternative B implementation is likely to increase sediment slightly in the short-term (one to two years), but in the longer term (three years or more) would reduce chronic sedimentation from Existing Condition or No-Action Alternative levels by up to 37 percent in the combined Rye Creek watersheds and up to 69 percent in Upper Sleeping Child. These reductions are a major step towards meeting TMDL and other water quality goals, and would improve aquatic habitat and water quality within the assessment area watersheds, and especially within the Project Area.

C. Wetlands

The proposed activities may affect some channel-related wetlands. The proposed activity effects discussed in the Aquatic Habitat and Water Quality effects section are the most likely scenario for wetlands immediately below culvert removal sites. The effects of culvert removal or road recontouring, connector trail construction, specified road construction, and road or trail use are expected to be beneficial because of long-term reduction of chronic sediment associated with the former upstream road crossings. Some sites adjacent to open routes will continue to see chronic sedimentation associated with route use and

maintenance. Design Features (Table 2-2) are applicable to wetlands as well as streams, and are expected to minimize sediment-related effects of the proposed activities.

D. Fish Populations

Implementation of Alternative B would benefit westslope cutthroat trout and bull trout. The magnitude of the benefit is small but incrementally important. Although the project clearly benefits the species habitat, the effects would be difficult to quantify. Habitat and populations vary greatly with factors greater than the effects of this project, such as fire, flood, and drought. Additionally, fish and aquatic dependent animals are difficult to monitor with precision.

The initial increases in sediment that result from disturbances associated with storing and decommissioning roads are minor and short-term. Design Features and BMPs used recently have shown to be effective at limiting sediment delivery to aquatic habitat (Brassfield personal observations of upper Threemile Creek road decommissioning in 2014).

Over the long term, Alternative B greatly reduces the risk of a larger sedimentation pulse resulting from deteriorating and under-sized culvert failure. Although each culvert failure is a pulsed event, at a broader view, a group of culverts failing over time creates a chronic problem for fish downstream.

3.2.8 CUMULATIVE EFFECTS OF ALTERNATIVE B

Cumulative impacts can result when the effects of one activity are added to or interact with other activities in a particular place and within a particular timeframe. It is the combination of these effects that are referred to as cumulative effects. Past, present, and reasonably foreseeable land use activities are discussed for each area to evaluate potential cumulative effects of the action alternatives.

The potential cumulative effects associated with Alternative B are analyzed at two different scales. For hydrologic processes, aquatic habitat, and water quality, the cumulative effects are discussed at the watershed scale; in this case the upper Sleeping Child, upper Rye and lower Rye Creek watersheds. Fisheries were also discussed at a broader scale to incorporate the effects on downstream habitats and to include the portion of the Bitterroot River that ties Rye Creek to Sleeping Child Creek.

A. Hydrologic Processes, Aquatic Habitat and Water Quality, and Wetlands Cumulative Effects

Past management activities in the three analysis area watersheds include road management activities, timber harvest, silviculture, fuels management, and fire management. The vast majority of these uses have occurred on National Forest lands, which occupy a large portion of upper Sleeping Child, Upper Rye Creek, but a smaller portion of Lower Rye Creek.

Future management activities in the analysis area watersheds are likely to be the same as the past and present. There is currently no planned timber management for any of the watersheds due to fire and past harvest limiting potential. There is a second project planned (Darby Lumber Lands Phase II) that would likely propose activities similar to those in this project, in the western portion of Lower Rye Creek, Robbins Gulch, and the smaller drainages that connect to the Bitterroot River between Little Sleeping Child and Rye Creek. This project is also expected to reduce cumulative effects similar to Phase I. The Forest-wide Travel Planning Project, currently planned for a decision in 2015, is also likely to reduce cumulative effects to a small degree, by clarifying where motorized access is appropriate, and in some cases, reducing motorized use below existing levels and reducing road and trail disturbance.

This project was designed to reduce long-term road-related effects, which would reduce cumulative effects to aquatic habitat, water quality and wetlands. Direct, indirect, and cumulative watershed and aquatics

effects of Alternative B are expected to be beneficial. Alternative B is expected to result in a net reduction in sediment and reduce long-term cumulative effects on hydrologic processes, aquatic habitat, water quality, and wetlands.

It is unknown how much activity will occur on private lands in the foreseeable future. There are no large-scale new activities proposed for the near future on private lands, but housing development, new construction and some new roads are likely. Agricultural practices that affect water quality, such as fertilization, streamside grazing or corrals, and riparian clearing, would likely continue at the current level.

B. Fish Population Cumulative Effects

Implementation of Alternative B would have a cumulative benefit on westslope cutthroat trout and bull trout in the analysis area. This project's effects complement other projects that have been accomplished. Examples include: replacement of culverts in Two Bear Creek of Sleeping Child Creek, and replacement of culverts and major road restoration along Rye Creek. There are also 3 culvert replacements already planned in the upper Sleeping Child or Rye Creek subwatersheds (USDA Forest Service 2010). Cumulative, these projects would eventually have incremental and positive effects downstream in the Bitterroot River. The magnitude of the benefit, especially as the distance from the projects increase, would be difficult to quantify. The reason for the difficulty in measure benefit is the same as explained in the Direct and Indirect section above.

Minor and short-term initial increases in sediment would be expected from disturbances associated with storing and decommissioning of roads. The effect is in addition to the cumulative effects listed in *Forest Service Land Uses Contributing to Cumulative Effects* (following section). Of the listed cumulative effects, the most concerning and relative are the road-related activities that are chronic and ongoing, or foreseeable. Examples are:

- Road maintenance that can loosen surfaces and expose them to erosion; and
- Lack of road and trail maintenance that can result in accelerated rutting and erosion of roads, their ditches, and trails.

A cumulative effect that was mentioned during scoping was the effect of increased traffic on what may become a more popular trail system. It does appear likely that there would be some degree of increased traffic, but the effect on fish and aquatic habitat is expected to minor. The trail locations would be outside of stream channels, and the quantity of eroded soil that would reach stream channels is expected to be negligible.. Generally, it is expected that the trails that would be driven would remain stable and have their drainage features maintained at the same level as the existing trails on the Forest.

C. Forest Service Land Uses Contributing to Cumulative Effects

The following discussions highlight land uses on Forest Service land that have the potential to contribute to cumulative effects on aquatic resources. A list of past, present and foreseeable activities is included as PF-CE-001.

Wildland Fire Suppression- Since about 1940, the Forest Service and State of Montana have actively suppressed wildland fires. These agencies will continue to suppress wildland fires in the project area watersheds. Suppression activities have the potential to impact aquatic resources primarily through ground disturbance and associated sedimentation. After a fire is extinguished, fire lines and other ground disturbances are rehabilitated to prevent erosion and sedimentation. It is impossible to predict when and where a wildland fire may occur.

Fishing – The current low level of fishing would continue in the project area watersheds. In the project area the streams are generally narrow and brushy. The trout are generally small (less than 8 inches) so they are

not an attraction for most anglers. There are a few locations that are popular to fish. These will remain popular because the sites contain deeper pools, have less brush around them, and the fish are often visible from shore. The project will have no effect on angling access in the more popular lower sections of the larger streams or the Bitterroot River.

Road Maintenance and BMPs- Road maintenance is likely to continue into the future. Culvert upgrades, drainage improvements, and other road improvements are expected to occur prior to opening currently closed roads, and occur at a lower frequency over the long term. Other than those noted above, there are no major BMP upgrades planned for area roads at this time. Roads designated for public motorized uses are maintained for a specific access level (e.g., passenger car or high-clearance vehicles), safety and erosion control. This primarily involves repairing drainage features and clearing of live and down vegetation. Some roads have been closed and are maintained at a lower level (e.g., R-1 designation), where maintenance typically occurs if a resource is threatened or if fire suppression access is needed. Table 2-1 displays the road miles within the project area. Maintenance activity focuses on those roads with the highest activity and potential resource threats (e.g., FR75, Skalkaho-Rye Road).

Beaver Control - Trapping of beavers occurs on all ownerships and is likely to continue. Destruction of beaver dams may occur on private lands downstream of the project area.

Timber Harvest - Past commercial timber harvest has ranged from individual tree removals to complete clearcuts. There is currently a personal use post and pole sale in the Upper Rye Creek watershed. There is no watershed impact from this activity, as no heavy equipment is used, and the type and number of vehicles do not affect the road condition. The most recent timber sale in the analysis area ended in 2006. Timber harvest is expected in the long term but none is currently planned.

Prescribed Burning- Fire has been prescribed in the past as a method to reduce fuel loading, prepare sites for reforestation, and to include fire as an ecosystem process in areas after timber harvest activities. There has been no prescribed fire other than timber sale activity pile burning since 2006. Prescribed fire is expected in the long term but none is currently planned.

Road Construction- No specified roads have been built in the USFS or acquired Darby Lumber Company portions of the assessment area since Darby Lumber Company closed in the late 1990's. Roads have been built on private land in both Sleeping Child and Rye Creek watersheds. As described in the affected environment, roads can have a variety of direct, indirect, and cumulative effects on aquatic resources. The effects of past road construction are captured in the Affected Environment. Future road construction or reconstruction may occur in a second phase that will focus on the road system outside the current project area, but no specific activities are currently planned. New information within the project area may lead to further road and trail construction or reconstruction, but it is not planned as a substantial component of Phase II.

Road Decommissioning- Roads have been removed from the transportation system and made undriveable to improve wildlife security, landscape hydrologic function, and erosion control. Approximately 42 miles of roads were stored or decommissioned in the Rye Creek watershed with the 2001 Burned Area Recovery decision, which decommissioned and treated roads that were already closed at the time. There are six more miles yet to be put in storage. Monitoring results noted in PF-AQUATICS-001 suggest the treatments have been ecologically beneficial.

Future road decommissioning beyond Alternative B (Phase I) is expected in a second phase that will focus on the road system outside the Phase I project area. Phase II will focus on the Lower Rye Creek 6th-level watershed, which is within the current aquatics assessment area. New information may lead to further

road decommissioning in the Phase I project area, but it is not planned as a substantial component of Phase II.

D. Non-Forest Service Land Uses and Actions

The following land uses on non-Forest Service lands that have the potential to contribute to cumulative effects are described below.

Private Land Development- The only private land within the actual project area is the two parcels associated with the Crystal Mountain Mine. Activity on these parcels has been limited, but some hauling of mined material occurred in 2012 and 2013. The haul route does cross several intermittent and perennial tributaries to Rye Creek, and there likely was some sediment generated due to the activity. A limited amount of construction of driveways, buildings, and other improvements on private land within the assessment area has been occurring for decades and will continue, mainly in the North Fork Rye Creek and Dugout Creek drainages. The amount of development has been minimal due to the small amount of private land available in the project or assessment area. The Forest Service is not aware of any plans for substantial ground-disturbing development in the foreseeable future.

Timber Harvest- No timber harvesting on private property is currently occurring, and there is low probability of harvest occurring within the next 10-20 years due to lack of availability.

Fuels Reduction- Removal of live and dead vegetation for the purpose of reducing wildland fire intensity on private property within the project area is ongoing, but at low intensity. This activity is expected to continue. The extent of fuel reduction on private property is not known but is primarily limited to areas immediately adjacent to structures. The Forest Service is not aware of any substantial fuel reduction plans on private lands any time in the foreseeable future.

Agriculture- A minor amount of land on private property has been used and will continue to be used for agricultural purposes. The Forest Service is not aware of any plans to expand agricultural land uses on private lands in the foreseeable future.

3.2.9 REGULATORY FRAMEWORK AND CONSISTENCY

PF-AQUATICS-003 summarizes the regulatory framework for aquatic resources, and PF-AQUATICS-009 provides details of consistency with the parts of the Forest Plan that are specific to fisheries and INFISH.

A. Forest Service Policy

The Regional Forester has determined that westslope cutthroat trout and western pearlshell mussels are sensitive species. A biological evaluation (BE) is required for the action alternatives. All the necessary information for the BE is included in the Aquatic Resources section, and a separate BE is not required. The determination for Alternative B, in the short term, is that the project would "may impact individuals or their habitat, but will not likely contribute to a trend towards federal listing or loss of population viability." In the long term the project has a "beneficial impact".

The Forest will complete consultation with the USFWS for bull trout, a species listed as threatened under ESA, prior to the project decision. The consultation will use the programmatic consultation for Road-Related Actions. There are activities in Alternative B – Final Proposed Action that would be considered to adversely impact bull trout. These include any activities that would have more that discountable effect to critical habitat or individual bull trout. Alternative B – Final Proposed Action, after the first few seasons following restoration activities, would be have a beneficial effect (Table 3.2-6). The reduction in sediment from roads (Table 3.2-5) is the primary benefit derived from Alternative B – Final Proposed Action.

Table 3.2- 6: Aquatic Threatened and Sensitive Species Determination

Species	Species Occurrence in Analysis Area	Determination Alternative B – Final Proposed Action
Bull Trout (Threatened species)	Sleeping Child Creek	LAA[1] (short term) Beneficial (mid and Long term)
Westslope Cutthroat Trout (Sensitive species)	Sleeping Child and Rye Creek	MIIH[2](short term) Beneficial (mid and Long term)
Western Pearlshell Mussel (Sensitive species)	Outside Project Area, but within analysis area	No Impact

1 May Affect, Likely to Adversely Affect. 2 - May impact individuals or their habitat, but will not likely contribute to a trend towards federal listing or loss of population viability

B. Permitting

All required permits would be acquired prior to project implementation. Where work is needed within a stream and/or floodplain, the Forest Service would acquire a joint permit (commonly referred to as a "124" permit) from the Montana Department of Fish, Wildlife, and Parks. This permit ensures compliance with applicable State and Federal laws that relate to protection of streams, wetlands, floodplains, and other water-related features.

C. Regulatory Consistency

Comparing the proposed activities against the applicable regulations and laws, all of the proposed alternatives are consistent with the Federal Water Pollution Control Act (Clean Water Act), Endangered Species Act, the Streamside Management Zone Law, Federal Executive Orders, Forest Plan direction, and Forest Service Policy relating to aquatic resources.

Comments on the draft EA asked for clarity regarding INFISH (Inland Native Fish Strategy 1995), which amended the Forest Plan. The project meets the INFISH standards and guidelines by avoiding impacts to native fish (see Table 2.6-1: Design Features) and by moving the area toward to attaining the riparian management objectives. A more detailed explanation has been included in in the project files (AQUATICS-009). None of the connector routes (A – D, G and H) or Trail 104 are within the standard RHCAs outlined in INFISH.

3.3 FIRE/FUELS

The fire/fuels analysis for this project focuses on access necessary for suppression activities and access for future fuels/thinning treatments.

3.3.1 SCOPE OF ANALYSIS AND ANALYSIS METHODS

The analysis area boundary for this Fire/Fuels report is the Darby Lumber Lands Phase I project area boundary, which includes 28,758 acres.

The analysis of access for suppression and future suppression was included in the transportation analysis process completed by the ID team. The transportation analysis involved the review of all routes in the project area and there need for management of all resources. Access for suppression and future thinning was a key consideration in the analysis and recommendation for management on all routes.

The effects of fuel loading from focused thinning treatments in aspen stands (49 acres) have also been assessed for short-term fuel loading.

3.3.2 EXISTING CONDITION

Several large fires have burned through the Darby Lumber Lands project area in the last 60 years (Figure 3.3-1). The Sleeping Child Fire in 1961 burned most of the high elevation, eastern portion of the project area. In 2000, a large majority of the project area burned at high severity including the re-burn of areas in the 1961 Sleeping Child Fire. Stand replacement fire dominated the landscape during both these fire events.

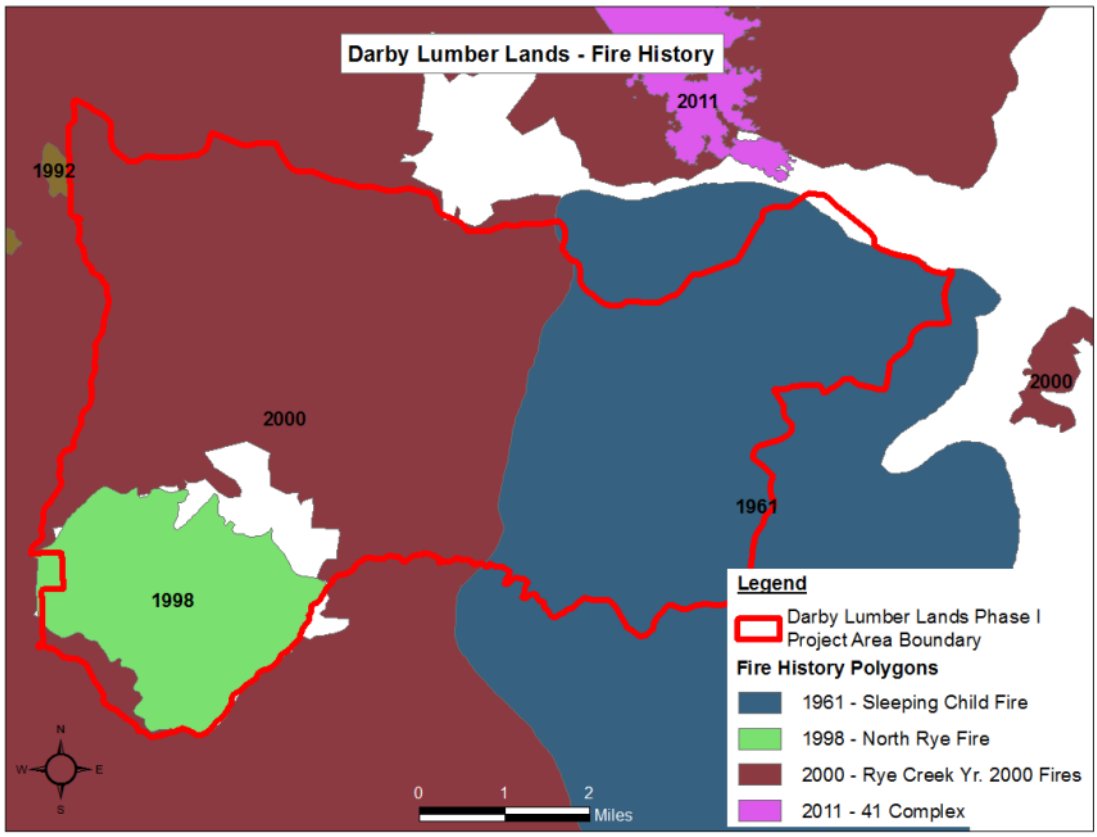

Figure 3.3- 1: Fire History for the Darby Lumber Lands Phase I Project Area. The Sleeping Child Fire in 1961 and the Fires of 2000 burned much of area at a high severity, stand replacement occurred widespread.

Figure 3.3- 2: General fuels condition across much of the project areas

Fuels in most stands consist of a grass-shrub fuel model GS1 (121) or GS2 (122) moderate dry climate grass shrub model (PF-FUELS-001). Grass and shrubs has successfully reestablished across much of the area and lodgepole regeneration is occurring across most of the areas that were burned in 2000 (Figure 3.3-2).

The areas burned in 2000 still have a number of standing snags. These snags will eventually fall to the forest floor and as coarse woody debris. Coarse wood that does not decompose may contribute to increased fire behavior for areas that re-burn in the future.

3.3.3 DIRECT AND INDIRECT EFFECTS COMMON TO ALL ALTERNATIVES

A. Probability of a Wildland Fire Occurrence

Wildland fire is a natural ongoing process whose time and location cannot be precisely predicted by fire behavior science. Life, resources, and property are always at risk during a large wildland fire event. The proposed alternatives in this project do not have an influence on the time and place a natural fire may start. Human caused fire is also unpredictable, but can be prevented in most cases with education and enforcement.

The probability of a natural, lightning caused fire starting in the 28,758 acre Darby Lumber Lands project area is high. The majority of fires in this remote area are lightning related. Fires generally move in a west to east pattern in this area.

Any wildland fire in the project area would necessitate an appropriate management response. The Bitterroot Forest Plan, Bitterroot Fire Management Plan and agency policy direct that wildland fires will be suppressed using rapid, aggressive initial attack actions to control the fire. Proposed actions in this project considered the ability of suppression forces to have access areas to effectively control the wildfire within the project area.

Fire History / Fire Occurrence

The Darby Lumber Lands project area experienced 149 total number of fire starts from 1986 – 2013 as compared with 3,905 fire starts on the Bitterroot National Forest as whole.

Table 3.3- 1: Fire Starts by Cause for Bitterroot National Forest Compared to Starts Within the Darby Lumber Lands Phase I Project Area (1986 – 2013)

	Bitterroot National Forest	**Darby Lumber Lands (inclusive of DLL Phase 1)**
Total Number of Fires (1986-2013)	3,905	149
Lightning	3,303	132
Equipment Use	13	1
Smoking	44	1
Campfire	301	6
Debris Burning	75	6
Railroad	1	0

Arson	17	0
Children	30	0
Misc.	121	3

Lightning is by far the greatest ignition source for fires across the Bitterroot National Forest and that trend continues for the project area. Lightning accounts for 84% of starts across the forest and 88.5% within the project area. Increased recreation use may slightly increase human caused starts within the project area but the increase is expected to remain consistent with the range of human caused fire starts recorded across the forest. Lightning will continue to dominate the number of fire starts in the future across the project area.

3.3.4 DIRECT AND INDIRECT EFFECTS

A. Alternative A - NO ACTION

Alternative A would not alter access for fuel treatments or fire management. The existing system roads provide adequate access in the short-term. In the long-term, it would be necessary to identify which roads are needed for fuels management and fire suppression access.

There would be no change to the current fuel conditions under this "no action" alternative, except from the continuance of wildfires that would occur in the area over time and the continuing decline of lodgepole from beetles, which could help increase the fuel hazard in the area.

B. Alternative B – Proposed Action

Alternative B does propose travel designation changes to roads in the project area. The miles of roads open for motorized travel in Alternative B is relatively similar to Alternative A. Overall, the slight changes in open roads and routes with seasonally restricted travel will not limit the ability of the forest to suppress fire and complete fuel treatments in the project area. The proposed action develops a transportation system that will be better suited for future management and it will limit impacts to resources when compared to the existing road system. The proposed action will also improve access for future fuels treatments and fire suppression by improving the condition of open and seasonally open routes.

Alternative B does propose to decommission approximately 66 miles of road and store an additional 51 miles. The decommissioning and storage of these roads will not limit access for fire suppression or fuel treatments since the majority of these routes have grown in with vegetation, been blocked by falling snags, or have wash outs that prevent travel. Increased recreation use on OHV routes may slightly increase human caused starts within the project area but the increase is expected to remain consistent with the range of human caused fire starts recorded across the forest.

Similar to Alternative A, there would be no change to the current fuel conditions since no fuel reduction treatments are proposed in the project. Limited thinning would occur in several aspen stands (49 acres total) to reduce completion from conifers. The effects of the small scale, focused thinning would not alter fuel conditions on a landscape scale.

3.3.5 CUMULATIVE EFFECTS

Selection of Alternative B would change but not eliminate access for fire, fuels, or vegetation management. The majority of the roads proposed for treatment under this alternative are currently in a condition that does not allow use for fire or vegetation management. The majority of suppression fires are accessed by foot from the nearest drivable system road. The preferred travel routes for forest management were

identified during project planning and roads analysis (PF-TRANS-001) and these, along with the regular system roads would be available for use for forest management activities.

There would be no cumulative effects on vegetation, fuels or fire management considering past, present and reasonably foreseeable activities and projects in conjunction with Alternative B because there are no direct or indirect effects.

Alternative B maintains sufficient access to manage fire, fuels and vegetation and for potential future timber management activities in the Timber Management Areas identified in the Forest Plan. This is consistent with Forest Plan direction to use environmentally acceptable methods for accessing and harvesting timber.

3.3.6 Regulatory Framework and Consistency

Activities considered in the alternatives are consistent with direction in the Forest Plan, Appendix M (Fire Management Direction) and protection standards described for Management Area 1, 2 and 3a.

3.4 AIR QUALITY

3.4.1 Introduction

Air quality concerns associated with the Darby Lumber Lands project include the amount and concentration of particulate matter that may be produced by road work and decommissioning from road particulate dust. Dust from vehicle traffic on roads (the main Rye Creek county road that leads to the National Forest boundary and FS roads in the project area) has also been included in comments as concern for particulate matter.

3.4.2 Area of Analysis

Airshed 4, Ravalli County, Montana, is the primary air quality analysis area. There are no non-attainment areas in Airshed 4. Non-attainment areas in Montana closest to Airshed 4 are Missoula, 17 air miles north/northwest; and Butte, 100 miles east. Missoula is both a non-attainment area and an impact zone. The nearest impact zone is Salmon, 100 miles south. Airshed 4 is adjacent to and connected with Montana Airshed 3A, 3 B, 5, and Idaho Airshed 13.

3.4.3 Air Quality Regulatory Framework

Air quality regulations include the federal standards under the Clean Air Act of 1970 and State of Montana Ambient Air Quality Standards (MAAQS). Information regarding air quality regulations can be found at:

http://deq.mt.gov/AirQuality/airRules.mcpx

The Bitterroot Valley is located within Airshed 4. Air quality issues in Airshed 4 are related primarily to burning and smoke particulate. Members of the Montana/Idaho Airshed Group report planned burns to the smoke Monitoring Unit in Missoula. Burns are reported by “airshed” (geographical areas identified by the Airshed Group with similar topography and weather patterns) and “impact zones” (communities identified by the Airshed Group susceptible to smoke intrusions). The smoke Monitoring Unit meteorologist/program coordinator evaluates proposed burns, existing air quality, and forecasted weather conditions including atmospheric stability and transport winds. This information, in consultation with the Montana and Idaho air quality regulators, is used to issue daily burn restrictions for members of the Airshed Group. Burn restrictions are issued primarily from spring through fall. Montana DEQ prohibits prescribed burning in the winter (December – February) except for those few burns deemed “essential” and approved by them.

3.4.4 EXISTING CONDITION

A. Sources of Particulate Matter

Wildland fires and prescribed fires on the Bitterroot National Forest, as well as private debris burning, agricultural burning, and wood burning stoves all contribute particulate in Airshed 4. Many residents burn fence rows and irrigation ditches in the early spring. Farmers in north Idaho burn large grain fields in the fall and smoke is transported into Airshed 4 by a west to southwesterly flow. The Airshed also receives emissions from increasing numbers of cars and trucks. Inversion conditions, which are common during the winter, often trap pollutants in inhabited areas. Road dust, including that from winter road sanding and summer use of unpaved roads, contributes particulate matter emissions. There are no known large stationary point sources of air pollutants in the Bitterroot valley.

Nature and Sources of the Pollutants:

The term particulate matter refers to tiny liquid or solid particles in the air. These particles can be released directly into the air from many different sources. The size of particulate matter suspended in the air ranges from less than 0.1 micron (micrometer) in diameter up to 50 microns. Each micron measures approximately 0.0004 inch, or one-seventh the width of a human hair. Particles larger than 50 microns in diameter are too heavy to stay suspended in the air for long periods—they fall very close to their source before people can inhale dangerous amounts. Particles less than 2.5 microns in diameter, which are easily inhaled deep within the lung system, have the greatest effect on human health. Burning processes are the most common sources of particulate matter—fly ash (from power plants), carbon black (from automobiles and diesel engines), and soot (from slash burning, forest fires, fireplaces, and wood stoves).

Particles between 2.5 and 10 microns are usually associated with fugitive dust from wind-blown sand and dirt from roadways, fields, and construction sites.

Construction activities and vehicle traffic on unpaved roads can create nuisance dust when near residences or populated areas. The remote location of the project area will limit the potential for nuisance dust and forest users.

Further information on air quality can be found at the following websites:

http://deq.mt.gov/airmonitoring/citguide/understanding.mcpx#standards

http://www.epa.gov/airdata/

Bitterroot National Forest – Dust Abatement Activities

The Bitterroot National Forest has not performed dust abatement activities for citizens and private land owners. Dust abatement has been completed on several timber sale projects over the last 10 years for resource related issues such as water quality and fisheries concerns from log hauling. After the fires of 2000, dust abatement was completed along Rye Creek road 75 to the North Fork of Rye road 321 as part of a timber sale, for administrative action only. Dust abatement was completed on the Trapper Bunkhouse project in 2008 by the logger/operator on FSR road 716 from its intersection with road 374 to the Chaffin Creek Trailhead, not the section of the 374 road where private citizens lived (Jake Pintok, Engineering).

3.4.5 ENVIRONMENTAL CONSEQUENCES

Smoke from wildland fires would occur with all alternatives, dependent upon climate and weather. Wildland fires will continue to produce smoke, primarily during the summer months. No prescribed burning is planned with the thinning operations for the aspen stands in Alternative B.

Road maintenance, storage, and decommissioning activities may produce dust particulate. Vehicle traffic on county roads that access the project area as well as use on FS roads will create dust particulate during dry conditions. Based on past MDEQ data from the Boyd Park PM-10 monitoring site, particulate from activities in Alternative B including road dust from vehicle traffic will not cumulatively lead to particulate levels that could exceed threshold limits for Airshed 4.

There have been no reported air quality violations from construction activities similar to those in Alternative B - Final Proposed Action, or resulting from use of motorized routes on the BNF.

3.4.7 CUMULATIVE EFFECTS

Cumulative particulate effects from road treatments and recreational activities in Alternative B will not cause threshold limits in Airshed 4 to be exceeded.

3.5 WILDLIFE

3.5.1 SCOPE OF ANALYSIS AND ANALYSIS METHODS

This chapter analyses the direct, indirect, and cumulative effects of motorized use on selected wildlife species known to occur within or near the project boundaries. The project wildlife biologist incorporated recent scientific literature and reviewed Regional and national assessments and conservation strategies to ensure that the best available science was used for assessing impacts to wildlife species. Old growth habitat, snag habitat, elk cover percentages, and habitat criteria for other wildlife species were not analyzed because none of the alternatives would affect these habitat components.

Road and trail mileages and MVUM status were derived from the INFRA database. Mid-level habitat analysis for some wildlife species used vegetative data derived from satellite imagery through the R1-VMap project. Assumptions and limitations specific to the R1-VMap dataset are described in Project File document PF-WILD-001. Analysis methods for wildlife species are described within the individual species accounts.

3.5.2 REGULATORY FRAMEWORK

There is an abundance of law, policy and direction applicable to wildlife habitat considerations relative to resource management on National Forest lands. The Endangered Species Act (ESA) of 1973 mandates that the effects of land uses and management activities be evaluated as part of the biological assessment process for listed species. The National Forest Management Act (NFMA) of 1976 requires that the US Forest Service maintain sufficient habitat to sustain viable populations of native species. The National Environmental Policy Act (NEPA) of 1969 requires an assessment of the impacts of human activities upon the environment. Forest Service Manuals (FSM 2670) provide policy under which Forest Service projects are designed to maintain viable populations of sensitive species and to ensure that those species do not become threatened or endangered due to Forest Service actions. Ultimately, the Bitterroot Forest Plan provides specific direction for management of wildlife habitat by various management areas (MAs).

3.5.3 AFFECTED ENVIRONMENT AND EFFECTS TO WILDLIFE

A. Wildlife Species Analyzed and Summary of Effect Determinations

Species considered in this analysis include federally listed proposed, threatened, and endangered species on the latest USFWS List of Threatened, Endangered and Candidate Species for the Bitterroot National Forest (BNF) (PF-WILD-002), Forest Service Region 1 sensitive species (PF-WILD-003), and Forest Plan management indicator species (MIS) (USDA Forest Service 1987a). Table 3.5-1 lists the wildlife species in these categories known or suspected of occurring on the Forest, their status, habitat preference, whether

the habitat or species are present in the analysis area, and whether the habitat or species will be impacted by proposed treatments. Effects determinations for threatened, endangered and sensitive wildlife species are contained at the end of the individual species analysis sections, and are summarized in the biological assessment/biological evaluation summary for this project (EA Chapter 3, Section 3.5.9).

Table 3.5-1 shows that the following species and their habitats were dropped from further analysis because the analysis area is outside the range of the species' known distribution or because none of the proposed activities would affect suitable habitat or populations for the species, and thus there will not be any impacts to those species from the project: Threatened: yellow-billed cuckoo; Sensitive: bighorn sheep, fisher, northern bog lemming, Townsend's big-eared bat, American peregrine falcon, bald eagle, black-backed woodpecker, flammulated owl, Coeur d'Alene salamander, northern leopard frog, long-eared Myotis, long-legged Myotis; Management Indicator Species: pileated woodpecker, pine marten.

Table 3.5- 1: Wildlife Species Considered in the Bitterroot National Forest Travel Planning Analysis Area

Species[1]	***Habitat Preference and Occurrence in Project Area***	**Species Occurrence in Analysis Area**	**Species Impacted by Alternatives/ Summary Determination[2]**
Canada Lynx (T)	*Cool, moist habitats dominated by subalpine fir/Engelmann spruce/ lodgepole pine/, generally above 6,200 feet in elevation; vertical structural diversity in the under story (such as downed logs, seedling/saplings, shrubs, forbs) for denning and abundant snowshoe hare prey; lack of human disturbance during denning (4/1-8/1).*	Possible transient, but BNF currently classified as secondary, unoccupied lynx habitat by USFWS	Yes/NLAA USFWS recently added lynx to their list of species that may be present on the Bitterroot National Forest (as transient individuals). Analysis in EA.
Yellow-billed Cuckoo (western population) (T)	*Riparian areas with dense cottonwoods, willows, and shrubs. Habitat occurs along the Bitterroot River and major tributaries in valley bottom. Limited amount of marginal habitat along lower elevation larger tributaries on BNF.*	Accidental occurrence in the Bitterroot drainage. Not known to occur on the BNF	No/NE No suitable habitat in analysis area. No further analysis will be completed.
American Peregrine Falcon (S)	*Cliff nesting (ledges); aerial foraging over open areas for small to medium-sized bird species prey. Nesting habitat common in west side canyons.*	Numerous breeding territories known in Bitterroot Mountains, none in Sapphire Mountains	No/NI No potential nesting cliffs in analysis area. No further analysis will be completed.
Bald Eagle (S)	*Nesting trees/platforms near large rivers or lakes; available fish and water bird species prey. Most nests and wintering habitat occurs along river corridor in valley.*	One known nest on the BNF near Lake Como, all others on private lands near Bitterroot River	No/NI No suitable nesting or foraging habitat in analysis area. No further analysis will be completed.
Bighorn Sheep (S)	*Grasslands or open forest with steep, rocky escape terrain nearby Winter ranges generally used year round by ewe/lamb bands and young rams. Other portions of herds often migrate to summer ranges.*	No sheep herds known to occupy the project area	No/NI No further analysis will be completed.
Black-backed	*Burned or insect-killed snag concentrations,*	No habitat in areas	No/ NI

Species[1]	***Habitat Preference and Occurrence in Project Area***	**Species Occurrence in Analysis Area**	**Species Impacted by Alternatives/ Summary Determination**[2]
Woodpecker (S)	*limited to 5 or 6 years following mortality. Suitable habitat scattered across BNF.*	burned in 2000, where snags are too old to attract this species, or in previously clearcut areas. Rare and scattered in green forests.	Watershed rehabilitation work and motorized use of routes would not impact habitat or individuals. No further analysis will be completed.
Coeur d'Alene Salamander (S)	*Spray zones near waterfalls or seeps in fractured bedrock. Suitable habitat limited, mostly near west side streams. Species not know to occur in Sapphire Mountains.*	No records in the Sapphire Mountains	No/NI Outside known range of species. No further analysis will be completed.
Fisher (S)	*Moist coniferous forested types (including mature and old growth spruce/fir), riparian/forest ecotones. Suitable habitat predominantly along larger tributary streams.*	Very limited habitat and no recent occurrence records	No/NI No further analysis will be completed.
Flammulated Owl (S)	*Mature and old growth ponderosa pine (possibly mixed with Douglas-fir) with snags and open understories. Suitable habitat scattered across BNF in drier forested habitats.*	Lack of suitable habitat and no occurrence records in project area. Seasonal migrant	No/ NI Species is strictly nocturnal and tolerates mechanized disturbance well. Watershed restoration activities or motorized use of routes would not impact habitat or individuals. No further analysis will be completed.
Gray Wolf (S)	*Habitat generalist. Abundant prey availability (primarily large ungulates) and lack of human disturbance (corresponding to low road densities) preferred. Suitable habitat exists across BNF.*	Project area is within the territory of at least one known wolf pack	Yes/ MIIH Analysis in EA
Long-eared Myotis (S)	*Mostly forested areas or nearby openings. Often associated with old growth forests. Roosts in buildings, caves, mines, hollow trees. Nursery sites in buildings, caves, mines, rock crevices. Most probably migrate to warmer areas for winter.*	Little suitable habitat and no occurrence records in project area	No/NI No known roost sites or hibernacula. Species is nocturnal and would not be impacted by watershed restoration or motorized use of routes. No further analysis will be completed.
Long-legged Myotis (S)	*Montane coniferous forests, often at higher elevations. Roosts in buildings, under bark, rock crevices. Nursery sites in hollow trees, buildings,*	Little suitable habitat and no occurrence records	No/NI No known roost sites or

Species[1]	***Habitat Preference and Occurrence in Project Area***	**Species Occurrence in Analysis Area**	**Species Impacted by Alternatives/ Summary Determination**[2]
	rock crevices. Hibernates in caves and mines, but most probably migrate to warmer areas for winter.	in project area	hibernacula. Species is nocturnal and would not be impacted by watershed restoration or motorized use of routes. No further analysis will be completed.
Northern Bog Lemming (S)	*Wet riparian sedge meadows, bogs, and fens. Scattered potential habitat in wetlands and riparian areas across BNF.*	Little suitable habitat and no occurrence records in project area	No/NI No motorized routes in suitable habitat. No further analysis will be completed.
Northern Leopard Frog (S)	*Non-forested ponds. Apparently extirpated from Bitterroot drainage.*	No longer occurs in Bitterroot	No/NI No further analysis will be completed.
Western (Townsend's) Big-Eared Bat (S)	*Roosts in caves, mines, rocks, and buildings. Forages over tree canopy, over riparian areas, or water. Potential habitat in scattered old mines, rock crevices, and cabins.*	Little suitable habitat and no occurrence records in project area	No/NI No known roost sites or hibernacula. Species is nocturnal and would not be impacted by watershed restoration activities or motorized use of routes. No further analysis will be completed.
Western (Boreal) Toad (S)	*Terrestrial habitat generalist; breeds in ponds, slow streams. Suitable habitat occurs across BNF.*	Some occurrence records; including known breeding sites	Yes/ MIIH Analysis in EA
North American Wolverine (Sensitive)	*Large areas of unroaded security habitat in high elevation areas with persistent, deep snow cover; secure denning habitat in high elevation boulder talus or under log debris; ungulate carrion in winter. Suitable denning habitat in high elevation areas in Bitterroot and Sapphire ranges.*	Scattered occurrence records, no specific den sites known	Yes/MIIH Analysis in EA
Pine Marten (MIS for old growth)	*Mature and older lodgepole, subalpine fir and spruce forests with abundant down logs. Suitable habitat distributed across BNF.*	Little suitable habitat in project area	No No further analysis will be completed.
Pileated Woodpecker (MIS for old growth)	*Mature and older conifer forests or cottonwood gallery forests with large snags and down logs. Suitable habitat occurs across the Forest at lower to mid-elevations.*	Little suitable habitat in project area due to prior timber harvest and wildfire, and high elevations	No No habitat impacts. Watershed restoration activities or motorized use of routes would

Species[1]	*Habitat Preference and Occurrence in Project Area*	Species Occurrence in Analysis Area	Species Impacted by Alternatives/ Summary Determination[2]
			have negligible effects to individuals. No further analysis will be completed.
Elk (MIS for commonly hunted species)	*Habitat generalist found across the Forest. Winter range in lower elevation conifer/shrub/grasslands. Summer range in higher, mesic habitats.*	Numerous occurrence records in project area	Yes Analysis in EA

[1](T) = Threatened, (E) = Endangered, (S) = Sensitive, (MIS) = Management Indicator Species

[2] Definitions of Summary Determination Abbreviations: For TES species: NE = No effect, NJ = No jeopardy, NLAA = May affect, Not likely to adversely affect, LAA = May affect, Likely to adversely affect, BE = Beneficial effect. For Sensitive Species: NI = no impact; MIIH = may impact individuals or habitat, but will not likely result in a trend toward federal listing or reduced viability for the population or species; WIVH = will impact individuals or habitat with a consequence that the action may contribute towards federal listing or result in reduced viability for the population of species; or BI = beneficial impact.

3.5.4 ANALYSIS METHODOLOGY

Motorized and non-motorized access and associated human activities can impact wildlife populations and habitats. Direct effects to wildlife populations include disturbance, harassment, displacement from preferred habitats, and mortality due to increased access for hunting, poaching, and trapping, or from collisions with motorized vehicles. Indirect effects to wildlife populations include effects to habitat such as reductions in the numbers of snags and down logs resulting from removal for firewood, increased edge effects caused by the linear opening along roads and trails, increased risk of fire, and conversion of native vegetation to invasive weeds resulting from unintentional weed seed dispersal.

Most of the routes proposed for motorized use in the alternatives already exist and are already open for motorized use by some vehicles during all or part of the year. Since motorized use and associated habitat effects such as firewood gathering already occur on or along these routes, no measureable additional effects to wildlife habitat from continued motorized use on them are expected. Therefore, the wildlife analysis does not evaluate the effects of motorized or non-motorized use to wildlife habitat. Rather, the wildlife analysis will generally focus on effects to wildlife populations caused by human disturbance, which is often facilitated by motorized vehicles.

The Forest does not have use data on most roads and trails within the Forest. Wildlife analyses in this EA based on open road and trail miles in wildlife habitat make no distinction between open routes in regards to vehicle use levels. Models used in the respective analyses only differentiate between open and closed routes, and thereby assume that the level of use on each open route is the same. In reality, some routes obviously experience more use than others.

3.5.5 THREATENED AND ENDANGERED WILDLIFE SPECIES

The US Fish and Wildlife Service (USFWS) has determined that Canada lynx (Threatened) may occur on the Forest as transient individuals in secondary habitat, and that yellow-billed cuckoo (Threatened) may occur in suitable riparian habitat containing cottonwoods and willows (PF-WILD-002). No critical habitat for any T & E wildlife species has been delineated on the Forest. A lynx analysis is included below. Yellow-billed cuckoos are not known to occur in the Bitterroot drainage or on the BNF, and there is little to no suitable

habitat for them in the DLL project area. Therefore, the DLL project would have No Effect to yellow-billed cuckoos, and they will not be analyzed further in this EA.

A. Canada Lynx (*Lynx canadensis*) (Threatened)

Legal Status

The USFWS issued their latest updated list of threatened, endangered and candidate species that may be present on the BNF on January 8, 2015 (PF-WILD-002). The updated species list includes Canada lynx as a transient species that may be present in secondary/peripheral lynx habitat on the BNF (*Ibid).* In February 2009 the USFWS published a revised Canada lynx critical habitat designation (PF-WILD-004). The entire BNF, including the project area, is not within or in close proximity to designated lynx critical habitat.

In an amendment (PF-WILD-005) to the 2005 Canada Lynx Conservation Agreement (PF-WILD-006), the BNF was classified as unoccupied lynx habitat by the USFWS and the Forest Service. The addition of lynx to the USFWS list of threatened, endangered and candidate species that may be present on the BNF did not change the Forest's classification as unoccupied lynx habitat under the amended Canada Lynx Conservation Agreement.

The Record of Decision (ROD) (USDA Forest Service 2007d) for the Northern Rockies Lynx Management Direction (NRLMD) FEIS (USDA Forest Service 2007c) became effective July 16, 2007. The ROD amended the management direction in the selected alternative into all Forest Plans in the planning area, including the Bitterroot National Forest Plan. The NRLMD FEIS management direction incorporates the Terms and Conditions that USFWS issued in their Biological Opinion and Incidental Take Statement (USDI Fish and Wildlife Service 2007). Direction in the NRLMD ROD applies to mapped lynx habitat on National Forest System lands presently occupied by lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service and USFWS (PF-WILD-006).

Current Regional policy requires the Forest to consider the management direction in the NRLMD FEIS and ROD when designing management actions in unoccupied lynx habitat, and to analyze the effects of project activities to lynx. However, the NRLMD ROD (USDA Forest Service 2007d) states that Forests classified as unoccupied lynx habitat, such as the BNF, are not required to follow the direction in the NRLMD ROD (*Ibid)*. This analysis documents the Forest's consideration of the management direction in the NRLMD.

Effects Analysis Methods

Compliance with the Objectives, Standards and Guidelines contained in the Northern Rockies Lynx Management Direction FEIS is evaluated for each of the alternatives. In addition, the miles of roads and trails open to wheeled motorized use in lynx habitat were evaluated for each of the alternatives.

Affected Environment

Lynx Habitat Status

Lynx habitat in the BNF has been identified through an interdisciplinary process with USFWS to be generally areas exceeding 6,200 feet in elevation that support vegetation types dominated by subalpine fir or spruce (PF-WILD-007). Mapped lynx habitat in the project area is generally limited to areas near the ridgetops in the western two-thirds of the project area, but becomes more widespread as elevations increase in the eastern third of the project area. The current Bitterroot National Forest lynx habitat map (PF-WILD-007) classifies about 11,132 acres (12.9%) of the larger project area as mapped lynx habitat. About 10,194 acres are classified as lynx denning habitat, and about 938 acres are classified as lynx foraging habitat.

Almost all of the mapped lynx habitat roughly west of the Crystal Mountain Mine was burned by moderate to high severity wildfire in August 2000 (PF-WILD-038). Most of this area has experienced only limited

vegetative recovery since the fires, and does not currently provide habitat for snowshoe hares, the main prey species of lynx. Almost all of the mapped lynx habitat east of the Crystal Mountain Mine burned during the Sleeping Child fire in 1961 (*Ibid*). Much of this area has regenerated to conifer forest, and is currently in the stem exclusion structural stage which provides little habitat for snowshoe hares.

Lynx Population Status

Montana Natural Heritage Program records (PF-WILD-008) and Montana Department of Fish, Wildlife and Parks (FWP) trapping records (PF-WILD-009, 010 and 011) confirm that lynx have occurred in Ravalli County in the recent past. The last lynx trapping records in Ravalli County in the official FWP database are two animals captured during the 1986-1987 license year. Legal lynx harvest ended in Montana in 2000, but FWP has no reports of incidental lynx captures in Ravalli County since then (PF-WILD-012).

The Bitterroot National Forest has surveyed for lynx using approved protocols in 1999, 2001, 2002-3, 2010, 2012-12 and 2013-14. Lab analysis of hair samples collected during these surveys identified a number of different mammal species, but none of the samples contained lynx hair (PF-FPMON-001, PF-WILD-013 and 014). Multiple carnivore bait stations monitored using motion-activated cameras have similarly failed to detect any lynx.

While lack of detection cannot be interpreted to mean that lynx are absent, a multi-year effort using state of the art sampling methodologies in areas where lynx would be likely to occur has not produced any evidence that lynx are present on the Bitterroot National Forest. The latest scientific estimate of the current distribution of lynx in western Montana does not include any areas within or adjacent to the Forest (Squires et al. 2013).

However, lynx are known to be highly mobile and have a propensity to disperse long distances, particularly when prey becomes scarce (Mowat et al. 2000). Lynx also make long distance exploratory movements outside their home ranges (Aubry et al. 2000). For analysis purposes, it is recognized that transient lynx may be present on the Forest now or in the future.

Potential Impacts of Summer Motorized Use to Lynx

This project does not propose any changes in the amount of area open to over-snow vehicle use. Therefore, there is no analysis of the potential effects of over-snow vehicle use to lynx.

USFWS concluded that “The best information suggests that the types of roads managed by the Forest Service in the NRLA (Northern Rockies Lynx Amendment area) do not likely adversely affect lynx” (USDI Fish and Wildlife Service 2007). In the same document, USFWS further found that “Unlike paved highways, Forest roads rarely receive motorized use at levels that create barriers or impediments to lynx movements”. In a study conducted near Seeley Lake, Montana, Squires et al. (2010) found no evidence that lynx were sensitive to forest roads, including roads used by snowmobiles during winter. They concluded that seasonal resource-selection patterns of lynx were little affected by forest roads with low vehicular or snowmobile traffic. An analysis on the Okanagon National Forest showed that lynx neither preferred nor avoided forest roads, and the existing road density did not appear to affect lynx habitat selection (McKelvey et al. 2000b).

On the other hand, the USFWS acknowledges that human access via Forest roads can increase the potential for mortality or injury of lynx captured incidentally in traps aimed at other species or through illegal shooting (USDI Fish and Wildlife Service 2007). However, these concerns about increased lynx mortality only apply in areas that are occupied by lynx. Since the Bitterroot National Forest is currently classified as unoccupied lynx habitat (USDI Fish and Wildlife Service 2007), it is unlikely that motorized access on Forest roads would result in increased lynx mortality.

Based on cited literature, roads and trails open to summer motorized use in either of the alternatives are expected to have negligible effects to lynx. Although Forest roads do not appear to affect lynx use of lynx habitat, and represent a negligible increased risk of lynx mortality due to the Forest being unoccupied lynx habitat, the alternatives were evaluated using GIS to determine the number of miles of roads and trails within the mapped lynx habitat in the DLL project area that would be open to motorized vehicles some or all of the year (PF-WILD-015 and 032). Results for the alternatives are displayed in Table 3.5-2.

Table 3.5- 2: Miles of Roads and Trails Within Mapped Lynx Habitat Open to Motorized Use in the DLL Project Area

Alternative	Lynx Habitat Type	Miles of Roads Open to Motorized Use	Miles of Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
Existing Condition	Denning Habitat	33	7	40
	Foraging Habitat	3.8	0.3	4.1
Proposed Action	Denning Habitat	29.2	9.3	38.5
	Foraging Habitat	3.1	0.48	3.58

Direct and Indirect Effects

Alternative A would not affect existing lynx habitat or change the miles of roads and trails in lynx habitat open to wheeled vehicle use. Existing impacts to lynx (if present on the Forest) and to lynx habitat from summer motorized use would continue at current levels. Therefore, Alternative A would meet the NRLMD Objectives, Standards, and Guidelines for these management categories.

Alternative B would decrease the total length of routes open to motorized use in mapped lynx habitat across the larger DLL analysis area by about 2.02 miles. The length of open road in mapped lynx habitat would decrease by about 4.5 miles. The length of open trail in mapped lynx habitat would increase by about 2.48 miles. While summer use of Forest roads and trails is not known to negatively affect lynx use of habitat (USDI Fish and Wildlife Service 2007), reduced miles of open routes in lynx habitat would decrease the risk of disturbance or mortality to lynx to a small degree if transitory lynx are present in the area.

Alternative B meets NRLMD Objective HU O5 and Guidelines HU G4, G5 and G12 because it does not propose any new mineral or energy development, or affect any existing mineral or energy development. It meets NRLMD Guideline HU G6 because it does not upgrade the maintenance level to 4 or 5 on any unpaved roads in lynx habitat. It meets NRLMD Guideline HU G8 because it does not change routine maintenance along low-speed, low–traffic-volume roads. It meets NRLMD Guideline HU G7 because the location of new permanent road 62487 is not on a ridge-top or saddle, or in an area identified as important for lynx connectivity. This new road is very close to the location of existing road 715, but would route traffic around a corner of private land.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for lynx is the Sapphire Mountains and adjacent high elevation areas on the Lolo and Beaverhead-Deerlodge, National Forests that provide lynx habitat or may be used by

lynx as travel corridors. This analysis area is appropriate to analyze any incremental effects from the actions of this project on lynx in combination with past, present, and reasonably foreseeable activities because effects of implementing travel planning decisions within the project area would be negligible to lynx in more distant areas.

Activities Within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for lynx, which is described in the Affected Environment section, above. The impacts of management actions proposed in this EA are analyzed in the Direct and Indirect Effects section, and are not expected to affect the quality and distribution of lynx habitat

PF-CummulativeEffects-001 describes past, ongoing, and reasonably foreseeable activities that, when combined with the activities proposed in the DLL Phase I project, could potentially create cumulative effects to lynx.

Many forest activities have little effect on lynx habitat or populations for the following reasons:

- The activity's location is not within suitable lynx habitat;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Cumulative Effects from the Implementation of the Alternatives

Alternative A would not change the existing level of cumulative effects to lynx because it would not change existing lynx habitat or existing motorized access to lynx habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative B would decrease the total length of routes in lynx habitat open to motorized vehicles, which would reduce the risk of human-caused mortality and disturbance to lynx. These changes in motorized access would incrementally decrease cumulative effects to lynx, which is likely to be slightly beneficial for transient lynx or lynx that may occupy the Forest in the future. Cumulative effects to lynx from past, present or reasonably foreseeable actions listed in PF-CumulativeEffects-001 would likely continue. Cumulative effects at this slightly-reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, and are not concentrated in one area.

Trends and Broader Context

Montana Fish, Wildlife & Parks classifies the lynx as a Montana Species of Concern. The Montana Natural Heritage Program and FWP rank the lynx as a G5 S3 species (Montana Fish, Wildlife and Parks 2015). This means that at the global scale, lynx are considered to be common, widespread, and abundant (although they may be rare in parts of their range). They are apparently not vulnerable in most of their range. At the state scale, they are considered to be potentially at risk because of limited and potentially declining numbers, extent, and/or habitat, even though they may be abundant in some areas.

McKelvey et al. (2000a) looked at the historical distribution of lynx from the 1880s to the present. For Montana, they found evidence of lynx from museum specimens collected between 1887 and 1921 (three from the Bitterroot Mountains), and reliable trapping data obtained from the FWP beginning in 1950. These data show continuous presence of lynx in Montana since that time, based on over 475 lynx harvested by trappers. Lynx harvest data from Montana is cyclical in nature, with peaks corresponding closely in time and magnitude with those occurring in western Canada, especially for 1963 and 1971. Schwartz et al (2002) analyzed lynx genetic markers, and found strong support for the hypothesis that high levels of gene flow in lynx populations are the result of long distance dispersals that occur immediately after the peak of the lynx

cycle in the center of their range. This implies that lynx populations in Montana may be at least partially sustained by animals dispersing from Canada during peak years.

Montana Fish, Wildlife & Parks closed the lynx trapping season in Montana when lynx were listed as a threatened species. Currently there is no legal lynx trapping in Montana, although lynx may occasionally still be caught in traps targeting other species.

Effects Determination

Alternative A would have No Effect on lynx or their habitat since it would not change lynx habitat or existing motorized access to lynx habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative B would have negligible effects to the vegetative component of existing lynx habitat. It would reduce the total length of routes open to motorized use in mapped lynx habitat across the larger DLL analysis area by about 2.02 miles. These changes in travel management would incrementally reduce cumulative effects to lynx, which is likely to be slightly positive for transient lynx or lynx that may occupy the Forest in the future. The potential effects of slightly-reduced motorized use to lynx are either discountable or insignificant. As a result, the effects determination for lynx for **Alternative B** is May Affect, Not Likely to Adversely Affect.

See the biological evaluation/assessment Summary (Section 3.5.9) for documentation of the effects determinations for lynx under these alternatives. The BNF will submit a Biological Assessment (BA) for lynx to the USFWS to initiate informal consultation on effects to lynx from the DLL Phase I project The lynx BA will analyze the effects to lynx of implementing Alternative B – Final Proposed Action. Since effects to lynx appear to be minor and largely beneficial, the lynx BA will likely conclude that the effects determination for implementing Alternative B is May Effect, Not Likely to Adversely Effect. The Forest expects USFWS will review the BA and issue a Letter of Concurrence prior to the signature of the Decision Notice.

3.5.6 SENSITIVE WILDLIFE SPECIES

A. Gray Wolf (*Canis lupus*)

Effects Analysis Methods

For each alternative the following evaluation criterion were used to predict impacts to gray wolf:

- Prey availability
- Human disturbance as predicted by miles of roads and trails open to motorized use, and the percentage of the project area classified as Wildlife Core Security Area (percentage of an area classified as security area during the summer)

None of the activities proposed would make habitat unsuitable for wolves; therefore, habitat quality is not an evaluation criteria.

Affected Environment

Wolves are classified as a habitat generalist. The entire BNF is currently suitable habitat for wolves from the standpoint of the vegetation. The project area is within the territory of the Divide Creek pack. Other neighboring packs or individual wolves may travel through the project area occasionally. At least 16 wolf packs were known or suspected to use portions of the Forest at the end of 2013. Thirteen of these packs were classified as Montana packs, while three of them were classified as Idaho packs (USFWS et al. 2014).

Montana Fish, Wildlife & Parks implemented wolf hunting seasons beginning in 2009, and added a wolf trapping season in 2012 in an effort to reduce wolf numbers in Montana. Twenty wolves were legally harvested in Ravalli County in 2013, 10 by hunters and 10 by trappers.

The miles of roads and trails open to motorized use in both alternatives can be found in Chapter 2, Table 2-1. The methodology used to determine wildlife core security area is discussed in the Elk section (Chapter 3.5.7 (A), Wildlife Core Security Area subsection). Existing Wildlife Core Security Area acres and percentages can be found in Chapter 3.5, Table 3.5-13.

Direct and Indirect Effects

Table 3.5-3 displays the miles of roads and trails open to motorized use during the summer in the DLL Project Area (from Chapter 2, Table 2-1):

Table 3.5- 3: Miles of Roads and Trails Open to Motorized Use in the DLL Project Area

Alternative	Miles of Roads Open to Motorized Use	Miles of Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
A (Existing Condition)	115.9	22.9	138.8
B (Proposed Action)	91.6	42.4	134

Alternative A would not affect gray wolf habitat or populations in the short term. This alternative would not affect the availability of prey items for wolves because it would not change existing habitat conditions or the potential for human disturbance or mortality to big game. It would not change the potential for human disturbance or mortality to wolves because it would not affect existing open route densities.

Alternative B would decrease the risk of human disturbance and mortality to wolves and their prey species within the project area by reducing the total miles of routes open to motorized use. The miles of roads open to full-sized and trail vehicles and the number of miles of routes open only to trail vehicles would both decline.

The acreage of the larger DLL analysis area classified as Wildlife Core Security Area would increase from 3,158 acres to 3,483 acres during the summer (see Table 3.5-13). The amount of Wildlife Core Security Area would increase in the upper Sleeping Child drainage west of Skalkaho-Rye Road 75 (PF-WILD-017 and 033). This small increase in core security area would slightly reduce the risk of disturbance and mortality to wolves from human activities. In addition, reducing human access and associated disturbance to big game animals would be beneficial to wolves by reducing the risk of hunting and poaching mortality of wolf prey species. Reduced motorized use during the summer and early fall could ameliorate the existing tendency of elk to leave the DLL area for the security afforded by private land refuges. This would in turn tend to keep wolves in more remote areas for longer periods of the year, where they would be less likely to come in contact with livestock and humans. This alternative would not affect habitat suitability for wolves, which are a wide-ranging habitat generalist. The net effect from this combination of factors to local wolf populations is expected to be slightly positive.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for wolves is the Sapphire Mountains. This analysis area is appropriate to analyze any incremental effects from the actions of this project on wolves in combination

with past, present, and reasonably foreseeable activities because the effects of implementing travel management planning decisions in the DLL project area are negligible for wolves in more distant areas.

Activities Within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for gray wolves, which is described in the Affected Environment section, above. Wolves were not present on the BNF or adjacent areas during periods of extensive road construction and timber harvest prior to 1995, so those past activities had no direct or indirect effects on wolves.

The impacts of travel management activities proposed in the DLL EA are analyzed in the Direct and Indirect Effects section. PF-CummulativeEffects-001 describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the DLL Phase I project, could potentially create cumulative effects to wolverines. Many forest activities have little effect on wolf populations, because:

- The activity does not alter the suitability of the habitat for wolves, which are a habitat generalist;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Cumulative Effects from the Implementation of the Alternatives

Alternative A would not change the existing level of cumulative effects to wolves because it would not change existing habitat or motorized access. Past, present and reasonably foreseeable actions could have cumulative effects on wolves, in combination with the ongoing levels of motorized access that would continue to be allowed under DLL Alternative A.

Alternative B would decrease cumulative effects to wolves a small amount by reducing motorized access during the summer and early fall to parts of the DLL project area. This in turn would reduce the risk of human-caused mortality and disturbance to wolves, and to their ungulate prey base. Cumulative effects to wolves from past, present or reasonably foreseeable actions listed in PF-CumulativeEffects-001would likely continue. Cumulative effects at this slightly reduced level would be negligible, as they are generally short-term in nature, would occur at different times of the year, and are not concentrated in one area.

Trends and Broader Context

The Montana Natural Heritage Program and FWP rank the gray wolf as a G4 S4 species (FWP 2015). This means that at the global scale, wolves are considered to be uncommon but not rare (although they may be rare in parts of their range), and usually widespread. They are apparently not vulnerable in most of their range, but there is possibly cause for long-term concern. At the state scale, they are considered to be apparently secure, though they may be quite rare in parts of their range, and/or suspected to be declining.

Estimated wolf numbers within the Central Idaho Recovery Area (CIRA) that includes the BNF decreased from about 913 in 2009 to 673 in 2013. This decrease in estimated numbers was likely due to increased wolf mortality from legal wolf hunting and trapping in Montana and Idaho, combined with a lack of information caused by a reduction in the intensity of wolf monitoring efforts. This population data indicates that wolves occupy a similar amount of habitat as in 2009, but that the average known pack size has declined. 404 wolves were confirmed to have died in 2013 within the CIRA, including at least 399 due to human-related causes. 282 of the human-caused mortalities were legal harvest during wolf hunting and trapping seasons (USFWS et al. 2014).

Effects Determination

See the biological evaluation/assessment summary (Section 3.5.9) for documentation of the effects determinations for wolves under these alternatives.

Alternative A would have No Impact on wolves or their habitat since it would not change existing motorized access to wolf habitat. Cumulative impacts resulting from previous management actions would continue.

Alternative B would decrease motorized access to wolf habitat to some extent, and would therefore reduce cumulative effects to wolves to s small degree. It is likely that reducing human access to these areas would be somewhat positive for wolves, but the overall impact to wolf populations at larger scales would probably be minor. As a result, the effects call for Alternative B is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

B. Wolverine (*Gulo gulo*)

Legal Status

On February 4, 2013 the USFWS issued a proposed rule to list the wolverine in the contiguous United States as a threatened species under the Endangered Species Act (USDI Fish and Wildlife Service 2013). At the same time, USFWS published a proposed special rule under Section 4(d) of the ESA outlining the prohibitions necessary and advisable for the conservation of the wolverine (*Ibid*). This proposed Section 4(d) rule would prohibit take of wolverine from trapping, hunting, shooting, etc., while allowing incidental take associated with activities such as dispersed recreation, timber harvest, firefighting, mining, etc., if those activities are conducted in accordance with applicable laws and regulations (*Ibid*). However, USFWS subsequently withdrew the proposed rule on August 13, 2014 based on their conclusion that the factors affecting the DPS as identified in the proposed rule are not as significant as believed at the time of the proposed rule's publication. With this withdrawal, the wolverine was once again classified as a sensitive species in Region 1.

Effects Analysis Methods

Wolverines are generally solitary animals that range extensively through areas of alpine and subalpine habitats. Isolation from human presence and association with subalpine habitats characterize the general understanding of wolverine-habitat associations in the southern extent of the species' North American range (Copeland et al. 2007). Human activities in the vicinity of wolverine dens have been suspected of causing female wolverines to abandon dens and move kits, which could have negative impacts to reproductive success (Copeland 1996, Magoun and Copeland 1998). However, more recent reports indicate that wolverines may be able to tolerate at least some close approach by humans without abandoning their dens (Heinemeyer et al. 2010, Inman et al. 2007b; Persson et al. 2006). Squires et al. (2007) demonstrated that wolverine populations in small, isolated mountain ranges can be very susceptible to trapping pressure. The project does not propose any changes in the area open to over-snow motorized use. Therefore, the analysis assesses the potential for wheeled motorized use to cause disturbance or mortality to wolverines in suitable habitat outside of the denning season.

Affected Environment

The wolverine is a rare-to-uncommon inhabitant of boreal coniferous forests and arctic tundra (Copeland 1996). Wolverines have evolved to exploit a cold, low-productivity niche where growing seasons are brief, and food resources are limited, as shown by adaptations such as extremely large home ranges, territoriality, low densities, and low reproductive rates (Inman et al. 2012a). Recent studies have refined the understanding of wolverine habitat use, as fine-scale wolverine occurrence, documented via radio

telemetry and GPS technology, has been strongly associated with high elevation alpine and avalanche environments (Copeland et al. 2007; Krebs et al. 2007; Lofroth and Krebs 2007; Inman et al 2007b, Copeland and Yates 2008). More specifically, Inman et al. (2012b) found that habitat in the areas wolverines selected in the Greater Yellowstone Ecosystem was characterized by steep terrain with a mix of tree cover, alpine meadow, boulders, and avalanche chutes.

Wolverines do not appear to avoid people or roads and trails outside of the early spring denning season, and are sometimes found near trails and active campgrounds during summer (Copeland et al. 2007). They will also use unmaintained winter roads for travel (Ibid).

Wolverine researchers developed and refined a wolverine habitat model based on a number of habitat parameters (Inman et al. 2013; Brock et al. 2007). The model separates predicted wolverine habitat into primary habitat and maternal habitat. Table 3.5-4 displays the acres of predicted wolverine habitat in each of the two habitat classifications for the DLL analysis area (PF-WILD-019 and 020), based on GIS analysis of the wolverine habitat map from Inman et al. (2013).

Table 3.5- 4: Predicted Wolverine Habitat Acres in the DLL Analysis Area

Alternative	Wolverine Habitat Type	Wolverine Acres Analysis Area
Both	Primary Wolverine Habitat	4,104
Both	Maternal Wolverine Habitat	477

The wolverine habitat map (PF-WILD-019) shows that predicted primary wolverine habitat within the DLL project area is limited to the very upper reaches of the Sleeping Child drainage, generally east of the Crystal Mountain mine. The map also shows a small patch of predicted wolverine habitat on the ridge midway between Blacktail Point and White Stallion Camp, but this is likely to be a mapping artifact. Predicted maternal wolverine habitat within the DLL project area is limited to a small area east of Skalkaho-Rye road #75, along the ridge between Moose Meadows and Rooster Comb.

There is little evidence that wolverines avoid roads, trails, or human presence within wolverine habitat during the summer. However, motorized access increases the risk of human-caused mortality to wolverines, through poaching and vehicle impacts. As a result, the total length of motorized roads and trails in predicted wolverine habitat was used to compare the relative risk of impacts of motorized use to wolverines in the summer (PF-WILD-019 and 020). Table 3.5-5 displays the open road and trail miles in predicted wolverine habitat within the larger DLL analysis area for both alternatives.

Table 3.5- 5: Open Road and Trail Miles in Predicted Wolverine Habitat, DLL Project Area

Alternative	Wolverine Habitat Type	Open Road Miles	Open Trail Miles
A (Existing Condition)	Primary Wolverine Habitat	14.4	0.74
	Maternal Wolverine Habitat	0.9	0.54

Alternative	Wolverine Habitat Type	Open Road Miles	Open Trail Miles
B (Proposed Action)	Primary Wolverine Habitat	10.7	0.88
	Maternal Wolverine Habitat	0.9	0.54

Direct and Indirect Effects

Alternative A would not change the potential for human disturbance and mortality to wolverines during the summer because it would not change existing motorized access. About 15.3 miles of roads and 1.28 miles of trails would remain open to motorized use within predicted wolverine habitat (Table 3.5-4). The existing motorized access to more remote, higher elevation terrain would not change, which would continue to present a mortality risk to wolverines due to poaching or vehicle impacts in these areas. This alternative would not affect the existing physical structure of wolverine habitat because roads and trail treads are already in place and no vegetation treatments would occur.

Alternative B would reduce the total length of roads open to motorized use during the summer within predicted wolverine habitat by about 3.7 miles. (Table 3.5-4). Most of this reduction would occur in upper Sleeping Child Creek west of Skalkaho-Rye Road #75 (PF-WILD-019 and 020). However, **Alternative B** would increase the total length of trails open to motorized use during the summer within predicted wolverine habitat by about 0.14 miles. The net reduction of motorized routes within predicted wolverine habitat would be about 3.56 miles.

Although wolverines do not seem to avoid roads, trails, and human presence in suitable habitats during the summer, reduced motorized access to predicted wolverine habitat would benefit wolverines to some extent by reducing mortality risk due to poaching or vehicle impacts. **Alternative B** would have negligible effects to the physical structure of wolverine habitat. The net effect from reducing motorized access to local wolverine habitat and populations would be somewhat positive for wolverines.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for wolverines is the Sapphire Mountains, including potential wolverine habitat on the Bitterroot, Lolo and Beaverhead-Deerlodge National Forests. This analysis area is appropriate to analyze any incremental effects from the actions of this project on wolverines in combination with past, present, and reasonably foreseeable activities because wolverines that inhabit the Sapphire Mountains near the boundaries of the Bitterroot National Forest almost certainly include portions of adjacent national forests within their territories. However, the effects of implementing travel management decisions in the Sapphire Mountains would have negligible effects to wolverines in more distant areas.

Activities Within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for wolverines, which is described in the Affected Environment section, above.

The impacts of travel management activities proposed in the DLL EA are analyzed in the Direct and Indirect Effects section. PF-CummulativeEffects-001 describes past, present, and reasonably foreseeable activities that, when combined with the activities proposed in the DLL Phase I project, could potentially create cumulative effects to wolverines.

Many forest activities have little effect on wolverine populations, because:

- The activity does not occur in wolverine habitat;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Cumulative Effects from the Implementation of the Alternatives

Alternative A would not change the existing level of cumulative effects to wolverines because it would not change existing motorized access. Past, present and reasonably foreseeable actions could have cumulative effects on wolverines, in combination with the ongoing levels of motorized access that would continue to be allowed under **Alternative A**.

Alternative B would reduce cumulative effects to wolverines by reducing wheeled motorized access to parts of the analysis area that are predicted wolverine habitat. This in turn would reduce the risk of human-caused disturbance or mortality to wolverines. Cumulative effects to wolverines from present and reasonably foreseeable actions would likely continue.

Trends and Broader Context

FWP classifies the wolverine as a Montana Species of Concern. The Montana Natural Heritage Program and FWP rank the wolverine as a G4 S3 species (FWP 2015). This means that across its range the species is considered uncommon but not rare (although it may be rare in parts of its range), and usually widespread. It is apparently not vulnerable across most of its range, but there is possibly cause for long- term concern. In Montana, the species is considered potentially at risk because of limited and potentially declining numbers, extent, and /or habitat, even though it may be abundant in some areas.

Wolverines in the western United States and the interior Columbia basin occur widely at very low densities, but only in northwestern Montana are wolverine populations considered to be healthy and thriving (Witmer et al. 1998). Historical wolverine populations in the contiguous U.S. were extirpated by the early 20th century (McKelvey et al. 2014). In Montana, the wolverine was thought nearly extinct by 1920 from over-trapping (Newby and Wright 1955). Dispersal from Canada appears to have been responsible for re-establishing wolverine populations in Montana beginning in the mid-1930s (*Ibid*), as well as in other areas of the contiguous U.S. (McKelvey et al. 2014). Wolverine numbers increased in the western, mountainous region of Montana from 1950 to 1980 (Hornocker and Hash 1981), presumably as a result of reduced trapping seasons on other furbearers and increased dispersals from Canada. Isolated reports from the Bitterroot Range in 1948 and 1952 probably represented dispersing individuals (Newby and Wright 1955). Hornocker and Hash (1981) concluded that in Montana, extensive wilderness habitat, coupled with more restrictive furbearer harvest regulations, should provide secure wolverine populations in the foreseeable future.

Effects Determination

See the biological evaluation/assessment summary (Section 3.5.9) for documentation of the effects determinations for wolverines under these alternatives.

Alternative A would have No Impact to wolverine populations or habitat because it would not change the existing condition for motorized access to wolverine habitat. Existing motorized access that would continue under **Alternative A** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. Cumulative impacts resulting from previous management actions would continue.

Alternative B would reduce motorized access to predicted wolverine habitat within the analysis area. This would reduce cumulative effects to wolverines from disturbance and incidental trapping to some extent. While such reduction in motorized access would be positive for wolverines, motorized access in some wolverine habitat would still be permitted. Activities proposed under **Alternative B** would not affect the rate of climate change, which is considered to be the primary threat to wolverines. As a result, the effects call for **Alternative B** for wolverines is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

C. Western Toad (*Bufo boreas*)

Effects Analysis Method

Western toads are also commonly known as boreal toads. The analysis for western toads will focus on:

- Potential for direct mortality caused by motorized vehicles in terrestrial habitats (miles of open motorized routes regardless of proximity to water)

Affected Environment

Western toads are habitat generalists that are found in a variety of habitats from valley bottoms to high elevations. They breed in lakes, ponds, and slow streams with a preference for shallow areas with mud bottoms. Breeding season varies with elevation, but typically occurs soon after ice has left a particular site. Tadpoles are seen in ponds during the day. Toads are mainly terrestrial outside of the breeding season, and use vegetation types, areas of burning and harvest activities, and a variety of slope steepness in proportion to their availability on the landscape.

There are no known natural lakes or ponds within the roaded portion of the project area that could be breeding habitat for western toads. Breeding habitat is likely limited to scattered small ponds in roadside ditches created inadvertently when roads were constructed without proper drainage. For instance, Forest personnel have documented evidence of breeding in small ponds within the ditch or road prism of the White Stallion road (Road #1392) that are fed by seeps in the cut bank. The effects analysis for western toads assesses the number of miles of roads and trails open to motorized use in the project area, which can be used as an index of the risk for toad mortality from motorized use.

Direct and Indirect Effects

Table 3.5-6 displays the miles of roads and trails open to motorized use during the summer in the DLL Project Area regardless of their proximity to water (from Chapter 2, Table 2-1):

Table 3.5- 6: Miles of Roads and Trails Open to Motorized Use in the DLL Project Area

Alternative	Miles of Roads Open to Motorized Use	Miles of Trails Open to Motorized Use	Total Miles of Routes Open to Motorized Use
A (Existing Condition)	115.9	22.9	138.8
B (Proposed Action)	91.6	42.4	134

Alternative A would not change the risk of direct mortality to toads on existing roads and motorized trails because it would not change the road and trail miles open for motorized use. Toads would continue to be at risk of being run over and killed by motorized vehicles on these routes. **Alternative A** would not change existing impacts to breeding or terrestrial habitats for toads.

Alternative B would decrease the risk of direct mortality from motorized vehicles to toads using road and trail prisms within the project area by reducing the total miles of routes open to motorized use. The miles of roads open to full-sized and trail vehicles would decline more than the increase in the miles of motorized trail. Toads would continue to be at risk on routes that remained open to motorized use. Some decommissioning activities might reduce the number of potential toad breeding ponds inadvertently created by earlier road construction, although the Forest will leave as many of these ponds as possible without compromising the stability of road prisms. Likely increases in motorized use on new and existing motorized routes (such as White Stallion Road #1392) that contain potential toad breeding ponds may increase the risk of disturbance or mortality to breeding toads or tadpoles in those areas.

Cumulative Effects

Geographic Boundary

The defined cumulative effects analysis area for the western toad is the Rye Creek and Sleeping Child Creek drainages. This is a reasonable size to analyze effects because western toad movements and home ranges for adult toads range from approximately 440 yards to at least 1,750 yards from breeding sites (PF-WILD-021). Impacts of implementing travel management decisions in the DLL Phase I area would be negligible to toad populations in adjacent drainages. A regional assessment of population trends is also considered to provide additional context.

Activities Within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for the western toad, which is described in the Affected Environment section. The impacts of travel management activities proposed in this EA are analyzed in the Direct and Indirect Effects section. PF-CummulativeEffects-001 describes past, present, and reasonably foreseeable activities which, when combined with the activities proposed in the DLL Phase I project, could potentially create cumulative effects to western toads.

Many forest activities have little effect on toad populations, because:

- The activity occurs during the winter when toads are hibernating underground;
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Cumulative Effects from the Implementation of the Alternatives

Alternative A would not change the existing level of cumulative effects to toads because it would not change existing motorized access near potential toad breeding sites or in upland toad summer range. Past, present and reasonably foreseeable actions could have cumulative effects on western toads, in combination with the ongoing levels of motorized access that would continue to be allowed within the DLL Phase I area.

Alternative B would decrease cumulative effects to toads by reducing motorized access to some roads and trails near potential toad breeding sites, as well as on roads and trails crossing upland toad summer range. This in turn would reduce the risk of human-caused mortality and disturbance to toads. Cumulative effects to toads from past, present and reasonably foreseeable would likely continue. Additional cumulative effects would be concentrated in the DLL Phase I area during the summer and early fall, and would likely continue over time and possibly increase if the area becomes more popular with motorized users.

Trends and Broader Context

Montana Fish, Wildlife & Parks classifies the western toad as a Montana Species of Concern. The Montana Natural Heritage Program lists the western toad as a G4 S2 species (FWP 2015). Range wide, this means that the species is considered uncommon, but not rare (although it may be rare in parts of its range), and usually widespread. On the state scale, the species is at risk because of very limited and potentially declining numbers, extent and/or habitat, making it vulnerable to extirpation in the state.

According to historic accounts, the western toad was once considered common or abundant in western Montana. Surveys in the late 1990s showed that western toads were absent from a large number of their historic localities in the northern Rocky Mountains, and that although they were still widespread across the landscape, they occupied an extremely small proportion of suitable habitat (summarized in Maxell 2000). Surveys of more than 2,000 water bodies in western Montana since 1997 have found breeding populations at less than 5 percent of the sites (PF-WILD-022). Thus, the evidence to date suggests that western toads underwent a decline in the 1980s, and are now either in the process of recovering, or are continuing to decline because populations are small, isolated, and/or subject to other risk factors (Maxell 2000).

Effects Determination

See the biological evaluation/assessment Summary (Section 3.5.8) for documentation of the effects determinations for western toads under these alternatives.

Implementation of **Alternative A** would have No Impact to western toads, because it would continue the existing level of potential impacts to riparian habitat, and the existing risk of direct mortality to toads due to vehicle collisions on roads and trails open to motorized use. Cumulative impacts resulting from previous management actions would continue.

Alternative B would reduce the miles of routes open to motorized use within the project area. The risk of direct mortality to toads due to being run over by motorized vehicles would decrease somewhat. As a result, the effects call for **Alternative B** is May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal listing or loss of viability to the population or species.

3.5.7 MANAGEMENT INDICATOR SPECIES

A. Elk (Cervus elaphus)

Effects Analysis Methods

One Forest Plan standard was evaluated for each alternative:

- Elk habitat effectiveness (Wildlife and Fish Standard 14) (an index of habitat effectiveness based on the miles of roads open to motorized use within each third-order drainage divided by the area of that drainage).

Four other evaluation criteria not tied directly to Forest Plan standards were also used to predict impacts to elk:

- Elk habitat effectiveness index (similar to EHE but includes miles of roads and trails open to motorized use within a third-order drainage)
- Elk security during the general hunting season (percentage of an elk herd unit classified as security area during the rifle season)
- Elk security index during the archery hunting season (percentage of an elk herd unit classified as security area during the archery season)

- Wildlife core security area during the summer outside of any hunting season (percentage of an area classified as security area during the summer)

The Record of Decision for the Forest Plan requires retention of 25 percent of the big game winter range in thermal cover (USDA Forest Service 1987c). Thermal cover in winter range was not analyzed for this project because none of the proposed activities would change the existing amount of thermal cover. This standard will not be discussed further.

Affected Environment

Effects of Motorized Access to Elk

It has been repeatedly documented in Montana and throughout North American elk range, that vehicle traffic on forest roads evokes an avoidance response by elk. Even though the habitat near forest roads is fully available to elk, they cannot effectively utilize it (Lyon et al. 1985). Declines in elk use have been detected as far as 2 miles from open roads, but significant reductions in habitat effectiveness are usually confined to an area within a half mile. Losses in habitat effectiveness for elk can be mitigated by applying road design and location standards during construction, and reduced through road closures (Ibid).

A number of recent studies have further documented that off-road vehicle use evokes similar responses in elk (e.g. Wisdom et al. 2004, Naylor et al. 2009, Ciuti et al. 2012). Perhaps more importantly, elk in many areas across the western United States (including the Sapphires) appear to be changing their movement and distribution patterns in an attempt to reduce their risk of mortality due to human predation (hunting) (Burcham et al. 1999, Vieira 2000, Conner et al. 2001, Viera et al. 2003, Wertz et al. 2004; Haggerty and Travis 2006; Grigg 2007; Proffitt et al. 2010). Elk seem to be able to quickly assess gradients of (predation) risk across the landscape and respond accordingly. Elk respond similarly to predation risk from wolves and from humans, but their responses to human predation risk are stronger than responses to wolf predation risk (Proffitt et al. 2009). Elk avoid hunting pressure by finding habitats that minimize encounters with hunters. This "security cover" is most often thought of as dense forest cover with low open-road densities, but elk are increasingly using private lands that allow no or limited hunting as an alternative form of security area (Burcham et al. 1999, Proffitt et al. 2013).

A combination of increased motorized access to elk summer range and changes in land use practices on private lands that have increased the availability of de facto elk refuges have resulted in elk leaving summer ranges during archery season and migrating to winter ranges on private lands where hunting is not allowed or is limited (e.g. Grigg 2007). Elk in many areas, including parts of the Bitterroot valley, now spend most or even all of the year on private land winter ranges, and are largely unavailable to hunters on public lands. In the vicinity of the DLL project area, FWP studies of radio-collared elk show that many elk spend the entire year on or near the CB Ranch. Some of these elk use the DLL project area during the summer, but return to private lands at the beginning of archery season when motorized use levels increase on public lands (PF-WILD-023).

Population

The Forest Plan objective is to provide sufficient habitat to maintain the current (as of 1987) level of big-game hunting … opportunities (USDA Forest Service 1987a, II-5, II-7).

Elk trend counts for Bitterroot hunting districts come from FWP monitoring flights conducted each spring (PF-WILD-024), and are summarized in Table 3.5-7. Trend count figures from 1987 are also shown for comparison with the Forest Plan objective. Montana Fish, Wildlife & Parks population objectives come from the 2004 Montana Elk Plan (FWP 2004, amended).

Table 3.5- 7: Elk Trend Counts by Trend Count Area

Survey Year	Trend Count Area			
	Skalkaho to Sleeping Child Cr.	Sleeping Child to Rye Cr.	HD 270 Total	Bitterroot Drainage
1987	109	229	964	3,537
2004	392	555	2,226	6,775
2005	291	1,254	3,499	8,169
2006	416	1,521	4,135	7,915
2007	373	1,642	3,608	7,197
2008	351	1,579	3,299	5,950
2009	437	1,688	3,527	6,163
2010	361	1,642	3,480	6,293
2011	368	1,412	3,595	6,605
2012	419	1,334	3,332	6,238
2013	786	1,772	4,386	7,373
2014	536	1,128	3,822	7373
FWP Population Objective	N/A	N/A	2,600	7,070

Table 3.5-7 shows that the number of elk in the Bitterroot drainage and in HD 270 far exceeds the Forest Plan objective of maintaining the 1987 level of big-game hunting opportunities. The 2014 elk trend count indicates that the number of elk counted in the Bitterroot drainage was approximately 208 percent of the number counted in 1987. The number of elk counted in HD 270 in 2014 was approximately 396 percent of the number counted in 1987.

Cow/calf and cow/bull ratios are indicators of herd health. Cow/calf and cow/bull ratios for Bitterroot hunting districts come from FWP elk trend count flights (PF-WILD-025), and are summarized in Table 3.5-8 for HD 270:

Table 3.5- 8: Elk Cow/calf and Cow/bull Ratios for HD 270

Year	Ratio calves/ 100 cows	Ratio bulls/ 100 cows
1987	41/100	20
2005	36/100	17/100
2006	40/100	17/100

Year	Ratio calves/ 100 cows	Ratio bulls/ 100 cows
2007	29/100	21/100
2008	30/100	47/100
2009	15/100	10/100
2010	15/100	9/100
2011	19/100	8/100
2012	24/100	12/100
2013	23/100	9/100
2014	34/100	17/100

Cow/calf and cow/bull ratios plummeted in all HDs on the Forest in 2009. Cow/calf ratios have improved somewhat each year since then, and finally reached recent average levels again in 2014. Cow/bull ratios declined further in 2010, and have generally remained well below recent averages until they showed considerable improvement in 2014 (PF-WILD-025).

Direct and Indirect Effects of the Alternatives

Elk Habitat Effectiveness

The Forest Plan standard for elk habitat effectiveness (EHE) is to manage roads through the Travel Plan process to attain or maintain 50 percent or higher EHE in currently roaded drainages (those where more than 25 percent of the potential road system was in place in 1987), and 60 percent or higher EHE in drainages where less than 25 percent of the roads had been built (USDA Forest Service 1987a, page II-21). EHE values of 50 percent and 60 percent equate to open road densities of 2 miles and 1 mile of open road per square mile of land, respectively (Lyon 1983).This standard supports the Forest Plan objectives of maintaining habitat to support viable populations of wildlife species, and cooperating with the state of Montana to maintain the current level of big game hunting opportunities (USDA Forest Service 1987a, page II-5).

The EHE model (Lyon 1983) did not account for motorized use on trails, so they are not included in these calculations to determine compliance with the EHE standard; motorized trails are included in the EHE Index calculations in the next section. Open roads are defined as any road open to full-sized vehicles during all or part of the year Open road densities were calculated using these assumptions for third-order drainages wholly or partially within the Phase I project area using GIS and updated road status data contained in the INFRA database. The results of open road density calculations and resulting EHE percentages for both alternatives are contained in PF-WILD-034, and are displayed in Table 3.5-9.

Table 3.5- 9: Elk Habitat Effectiveness Percentages by Third Order Drainage In DLL Phase I

Third Order Drainage #	Existing Condition		Proposed Action		EHE Standard
	Open Road Density (Mi/Mi^2)	EHE (%)	Open Road Density (Mi/Mi^2)	EHE (%)	
04e257-1	1.40	56	1.26	57.5	50
04e257-3	1.37	56.5	1.34	56.5	50
04e258-1	0.00	100	0.00	100	60
04e258-3	0.00	100	0.04	99	60
04f259-1	3.45	35.5	2.69	43	50
04f259-2	2.59	44	1.78	52	50

Third Order Drainage #	Existing Condition		Proposed Action		EHE Standard
	Open Road Density (Mi/Mi²)	EHE (%)	Open Road Density (Mi/Mi²)	EHE (%)	
04f262-1	4.85	21.5	3.94	30.5	60
04f263-1	3.21	38	2.55	44.5	60
04f263-2	2.54	44.5	2.34	46.5	50
04f264-1	1.79	52	1.75	52.5	50
04f264-2	3.81	32	3.02	40	50
04f265-2	2.21	48	2.21	48	50
04s258-2	0.02	99.5	0.02	99.5	60

Alternative A would not change the existing condition for EHE. Only six of the 13 third order drainages that are wholly or partially within DLL Phase I currently meet the applicable EHE standard.

Alternative B would result in seven of the 13 drainages meeting the EHE standard. Implementation of **Alternative B** would improve the EHE in one of the third order drainages that does not currently meet the EHE standard enough that it would comply with the standard. It would also improve the EHE in three of the seven third order drainages that currently meet the standard, albeit by a small amount. It would improve EHE in five drainages that do not currently meet the standard, but not enough to bring them into compliance with the standard. It would slightly reduce EHE in one drainage that currently meets the standard, but that drainage would continue to meet the EHE standard. It would not change the existing EHE in three drainages, two of which currently meet the EHE standard.

Implementation of **Alternative B** would either improve or not change the existing EHE in all drainages within the DLL Phase I project area that do not currently meet the EHE standard. This change would be somewhat positive for elk. Alternative B would require a site-specific Forest Plan amendment for EHE because it does not bring all affected drainages into compliance with the EHE standard.

Elk Habitat Effectiveness Index

The Forest also calculated an EHE "Index" based on the EHE model described in Lyon (1983), but modified by including both roads and trails open to motorized use in calculating open route density. This analysis assumes that motorized traffic on trails affects elk similarly to motorized traffic on roads. Open **routes** are defined as any road **or trail** open to any type of motorized vehicles during all or part of the year (MVUM codes 1-4 and 7-10). This analysis used a hypothetical "EHE Index" guideline as a measure with which to compare open route densities within third-order drainages. This guideline uses open route densities of 2 miles/square mile in "roaded" drainages, and 1 mile per square mile in "unroaded" drainages as criteria of comparison. Since the original EHE model did not include motorized trails, this EHE Index is not intended for use when determining compliance with the Forest Plan EHE standard. Rather, it offers an additional way to compare the effects of the alternatives. The EHE Index allows a more comprehensive analysis of the effects of motorized use on the Forest to elk than EHE alone, although use of the EHE Index is not required by the Forest Plan.

Roads or trails that are open seasonally are considered open routes for the purposes of this EHE Index analysis because small herds of elk are present within the roaded part of many drainages within the Forest year-round, and never migrate to higher elevation summer ranges. Vehicle traffic on those routes thus reduces the effectiveness of elk habitat during the months of the year when elk are presumably present. Road prisms that are closed to full-sized vehicles but open seasonally or year-round to ATVs and/or

motorcycles are considered to be open routes for this EHE Index analysis because motorized use of trails is assumed to affect elk in ways similar to motorized use on roads.

Open route densities were calculated using these assumptions for third-order drainages wholly or partially within the Phase I project area using GIS and updated road and trail status data contained in the INFRA database. The results of open route density calculations for the existing condition are contained in PF-WILD-035, and are displayed in Table 3.5-10.

Table 3.5- 10: Existing Elk Habitat Effectiveness Index by Third Order Drainage In DLL Phase I

Third Order Drainage #	Existing Condition		Proposed Action		EHE Index Guideline (%)
	Open Route Density (Mi/Mi²)	EHE Index (%)	Open Route Density (Mi/Mi²)	EHE Index (%)	
04e257-1	2.33	47	1.27	57	50
04e257-3	2.28	47.5	1.46	55.5	50
04e258-1	2.67	43	2.94	40.5	60
04e258-3	0.89	63	0.79	66	60
04f259-1	3.47	35	4.16	28	50
04f259-2	2.61	44	2.41	46	50
04f262-1	5.34	16.5	4.71	23	60
04f263-1	3.89	31	3.77	32.5	60
04f263-2	2.66	43	2.40	46	50
04f264-1	1.79	52	1.75	52.5	50
04f264-2	4.17	28	3.35	39	50
04f265-2	3.68	33	3.68	33	50
04s258-2	1.36	56.5	2.20	48	60

Alternative A would not change the existing condition for the EHE Index. Only two of the third order drainages wholly or partially within the DLL Phase I project area currently meet the EHE Index guideline.

Implementation of **Alternative B** would improve the EHE Index in these two drainages, and would also improve the EHE Index in seven other drainages. Two additional drainages would then meet the EHE Index guideline. However, implementation of **Alternative B** would also reduce the EHE Index in three drainages that do not currently meet the EHE Index Guideline. Overall, these changes appear to be somewhat positive for elk because they would reduce the risk of disturbing elk on their summer ranges in nine drainages and increase this risk in three drainages . These changes could slightly reduce the existing tendency for elk to spend a majority of the year on private land winter ranges, although resulting changes in elk distribution would likely be minor.

Elk Security Area (Rifle Season)

Subsequent to the Forest Plan, a model developed by Hillis et al. (1991) has been used in recent Bitterroot National Forest project planning to ensure retention of adequate elk security area during the general hunting season when elk are most vulnerable. This model is intended to be applied on an elk herd unit scale, but herd unit boundaries have not been defined for the Bitterroot drainage. Therefore, this analysis uses the larger DLL project area as a surrogate elk herd unit.

Elk security areas were mapped within the DLL project area using GIS, based on the criteria from Hillis et al. (1991). Security areas are defined in Hillis et al. (1991) as non-linear polygons of cover that are greater than

250 acres and more than ½ mile from a road open to motorized use during the rifle hunting season. The DLL analysis considers motorized trails open during the rifle season to be equivalent to open roads. Hillis et al. (1991) recommended that at least 30 percent of an elk herd unit qualify as security area for the two alternatives are in the project file (PF-WILD-026 and 036). Table 3.5-11 displays the resulting security area percentages within the DLL project area using the above assumptions:

Table 3.5- 11: Elk Security Area in DLL During the Rifle Season

Alternative	Total Acres	Security Area Acres	Security Area %
Existing Condition	86,625	1,461	1.7
Final Proposed Action	86,625	1,461	1.7

This analysis shows that the existing amount of elk security area in the surrogate elk herd unit formed by the larger DLL project area is far below the 30% minimum level recommended by Hillis et al. (1991). This is due to high open road and trail densities in some areas, combined with a lack of cover throughout most of the area. The lack of cover within the DLL project boundary is a result of previous regeneration harvest on both BNF and former Darby Lumber Company lands combined with high severity fire that occurred during 2000. The amount of security area during the rifle season would be the same under both alternatives.

Elk Security Area Index During the Archery Season

In addition, the elk security area percentage during the archery season was analyzed separately. This analysis was a modified version of the Hillis, et al. (1991) technique, and it is presented as an "index" that allows comparison between alternatives. This analysis was performed using the same area and assumptions described in the Elk Security Area (rifle season) section. However, roads and trails were classified as open or closed to motorized use based on their status during the archery season. The project's wildlife biologist is unaware of any publication that recommends a minimum security area percentage during the archery season.

As discussed in the Effects of Motorized Access to Elk at the beginning of the Elk section of this chapter, elk in many areas have started to respond to hunting pressure during the archery season by moving to more secure areas, which increasingly are found on private lands that restrict or do not allow public hunting. Motorized access allows archery hunters to reach many remote summer ranges that used to be relatively secure areas for elk. This is a concern because increased access during archery season appears to cause elk to begin moving to private land refuges prior to the rifle season.

Maps for the two alternatives are in the project file (PF-WILD-028 and 037). Table 3.5-12 displays the Elk Security Area Index within the DLL project area using the above assumptions:

Table 3.5- 12: Elk Security Area Index in DLL During the Archery Season

Alternative	Total Acres	Security Area Acres	Security Area %
Existing Condition	86,625	907	1.1
Final Proposed Action	86,625	907	1.1

This Security Area Index analysis shows that there is currently very little elk security area within the DLL project area during the archery season. This is due to a combination of a high density of roads and trails open to motorized use and a lack of cover resulting from previous logging and wildfire. The amount of security area during the archery season would be the same under both alternatives.

Wildlife Core Security Areas

To analyze the general effects of motorized routes on elk outside the hunting season, a ½ mile buffer was applied to either side of each route open to motorized use during the summer. This buffer width was selected because several studies indicate that elk select for areas greater than ½ mile away from open roads (e.g. Lyon 1983, USDA Forest Service 1982). Other studies have shown that elk may be influenced by ATV travel on off-road transects more than 1500 meters away from the transect (e.g. Wisdom et al. 2004), so a ½ mile buffer width is conservative.

The area within this buffer along motorized routes is considered to be the "virtual footprint" of the route, within which motorized use may have some impact to wildlife. The percent of a defined area outside of this virtual footprint is then classified as "core security area." There is no cover component required for an area to qualify as core security area in this analysis. A minimum size for core security areas was not incorporated into the analysis. The core security area is the area in which wildlife is generally undisturbed by travel routes and the activities that occur on them. This approach was used to analyze the potential impacts of motorized use to elk during the summer, outside of any hunting season

Estimates of wildlife core security area percentages for the larger DLL project area based on the above assumptions were derived using GIS. Maps for the two alternatives are in the project file (PF-WILD-017 and 033). Table 3.5-13 displays Wildlife Core Security Area acres and percentages for the larger DLL project area.

Table 3.5- 13: Wildlife Core Security Area During the Summer In DLL Project Area

Alternative	Total Acres (on BNF)	Core Security Area Acres	Core Security Area %
Existing Condition	86,625	3,158	3.6
Final Proposed Action	86,625	3,483	4.0

This Core Security Area analysis shows that there is currently very little elk core security area within the DLL project area during the summer. This is due solely to the high density of roads and trails open to motorized use, since cover is not used as a criteria for this analysis. Alternative A would not change the existing condition for Wildlife Core Security Area.

Alternative B would increase the amount of Wildlife Core Security Area within the larger DLL analysis area by about 325 acres during the summer**.** The amount of Wildlife Core Security Area would increase somewhat in the upper Sleeping Child drainage west of Skalkaho-Rye Road 75 (PF-WILD-017 and 033). This small increase in core security area would slightly reduce the risk of disturbance and mortality to elk from human activities on motorized routes. Decreased motorized access during the summer and early fall could ameliorate the existing tendency of elk to leave the DLL area for the security afforded by private land refuges to a small extent.

Summary of Direct and Indirect Effects to Elk

Alternative A would not reduce the existing risk of human-caused disturbance and mortality to elk. Elk would continue to use the DLL Phase I area to some extent during the summer, but most would likely continue to leave the area for the relative protection offered by private land refuges during the archery season, and would be unavailable to public land hunters during the rifle season.

Alternative B would decrease the risk of human-caused disturbance and mortality to elk during the summer and the archery season. This would likely reduce the existing tendency of elk to leave the area

during the archery season, and could make elk more available to public land hunters during both the archery and the rifle seasons.

Cumulative Effects

Geographic Boundaries

The defined cumulative effects analysis area for elk is Hunting District 270 between Skalkaho Creek and the East Fork Bitterroot River. This analysis area is appropriate to analyze any incremental effects from the actions of this project on elk in combination with past, present, and reasonably foreseeable activities because it includes the area of several elk herd units contained partially within the Forest in the vicinity of the project area. Effects of implementing travel decisions in the DLL Phase I area would be negligible to elk herds in more distant areas. An assessment of information available at the state scale is also considered to provide additional context.

Activities Within the Cumulative Effects Analysis Area

Past actions have contributed to the existing condition for elk, which is described in the Affected Environment section, above.

The impacts of travel management actions proposed in this EA are analyzed in the Direct and Indirect Effects section. PF-CummulativeEffects-001 describes past, present and reasonably foreseeable activities that, when combined with the activities proposed in the DLL project, could potentially create cumulative effects to elk. The amount of elk security area, elk hunting regulations, forage production, and predator numbers all affect elk numbers in the Bitterroot drainage, but it is unknown how these factors interact to influence the trend in elk populations. In addition, increased motorized access to formerly remote elk summer range, combined with an increase in the amount of private winter ranges that are closed to hunting, has resulted in a dramatic shift in elk distribution to private lands in the Bitterroot and other areas.

Many forest activities have little effect on elk populations, because:

- The activity does not occur in elk habitat
- The activity's disturbance is too small to produce an effect;
- Project design features are applied to reduce the activity's effects to negligible levels;
- The time elapsed and natural recovery that has occurred since project completion has diminished effects to negligible levels.

Cumulative Effects from the Implementation of the Alternatives

Alternative A would not change the existing level of cumulative effects to elk because it would not change existing motorized access. Past, present and reasonably foreseeable actions could have cumulative effects on elk, in combination with the ongoing levels of motorized access that would continue to be allowed under **Alternative A**.

Alternative B would decrease cumulative effects to elk slightly by reducing the total length of routes open to motorized use in elk summer range, and by creating additional areas of core security area during the summer. However, the motorized loops that would be created are likely to attract increased levels of motorized use in portions of the area. The potential for human disturbance and mortality to elk during the summer could increase somewhat in areas near motorized loops, but would decrease in other areas where route densities decline and additional core security area is added. Cumulative effects to elk from past, present and reasonably foreseeable actions would likely continue. Cumulative effects from this project would be concentrated in the DLL Phase I area during the summer and early fall, and would likely continue over time and possibly increase if the area becomes more popular with motorized users.

Trends and Broader Context

The Montana Natural Heritage Program and FWP classify elk as a G5 S5 species (FWP 2015). This means that at both the global and state scales, elk are considered to be common, widespread, and abundant, and not vulnerable in most of their range.

Subsistence, market, and hide-hunting decimated elk herds across western North America in the 1800s, and by the mid-1880s elk were gone from eastern Montana, and were heavily impacted in western Montana. By 1910, elk numbers across North America were estimated to be less than 50,000 animals (Montana Department of Fish, Wildlife and Parks 2004). Elk numbers throughout the West have recovered dramatically since then, especially in the 1970s through 1990s (Toweill and Thomas 2002).

In Montana, only 8,000 elk were estimated to occur across the state in 1922 (Montana Department of Fish, Wildlife and Parks 2004). Through elk transplants, regulation of hunting, and natural increases in distribution, elk began to fill much of their former habitat. Today, all timbered mountainous areas of western and central Montana contain elk, and huntable elk herds exist in isolated mountain ranges and timbered areas of eastern Montana. In 2004, post-hunting season elk numbers in Montana alone were estimated to total 130,000 – 160,000 animals (*Ibid*). Elk numbers throughout North America were estimated at 1.2 million animals by 2000 (Toweill and Thomas 2002).

Elk trend counts for the entire Bitterroot drainage generally increased from 1,613 in 1967, to a new record high of 8,169 elk in the Bitterroot in spring 2005. Elk trend counts declined each of the next three years, and were down to 5,950 in spring of 2008 (PF-WILD-024) but have increased since then to 7,373 by 2014. Poor cow/bull and cow/calf ratios observed in 2009, 2010, and to a lesser degree in 2011 indicate problems in elk herd structure that could affect total herd numbers in the future, although these ratios have improved since then. The 2014 count was approximately 4 percent over FWP's elk population objectives for the entire Bitterroot drainage (FWP 2004 amended).

Elk numbers are so high in the Bitterroot drainage and across the range of elk in Montana and the rest of western North America that elk viability seems assured for the foreseeable future. Recent declines in elk numbers in the Bitterroot drainage have caused much local concern, but FWP elk trend counts show that the recent low point in elk populations (2008) was still higher than every year the trend count was completed up until 1999, and an increase of 60 percent over the elk trend count at the time the Forest Plan was signed in 1987 (PF-WILD-024). The trend count has increased dramatically since the recent low count in 2008 (*Ibid*).

Conclusion

Implementation of **Alternative A** would not impact elk populations or habitat because it would not change the existing condition for motorized access to elk habitat. Cumulative impacts resulting from previous management actions would continue. Elk populations would continue to be viable across the Forest under the existing condition.

Alternative B would decrease wheeled motorized access on routes in the DLL Phase I area, which would reduce the risk of human-caused disturbance and mortality to elk during the spring, summer and fall overall. This would decrease the cumulative effects of past actions to elk to some extent. While such local reductions in motorized access would be positive for elk, they would have only minor impacts over a limited area. These impacts would have little effect on the viability of elk populations at local and Forest scales, but could potentially result in more elk remaining on public lands for longer periods during the year.

3.5.8 CONSISTENCY WITH FOREST PLAN, LAWS, AND REGULATIONS

A. Bitterroot National Forest Plan

Consistency with the Bitterroot National Forest Plan (USDA Forest Service 1987a) forest-wide resource and management area standards would be accomplished in the following ways:

Forest-wide Management Resource Standards

Elk population status will be used as an indicator of commonly hunted ungulate species and the status of their habitat (USDA Forest Service 1987a, II-20).

How addressed:

Elk trend counts, cow/calf ratios and cow/bull ratios for the last 11 years and for 1987 are displayed and discussed in the EA, Chapter 3, Section 3.5.7 (A).

The recommendations in the Coordinating Elk and Timber Management Report will be considered during timber management and transportation planning (USDA Forest Service 1987a, II-21).

How addressed:

This publication (Lyon et al. 1985) was cited in the EA, Chapter 3, Section 3.5.7 (A).

Manage roads through the Travel Plan process to attain or maintain 50 percent or higher elk habitat effectiveness in currently roaded third-order drainages. Drainages where more than 25 percent of roads are in place are considered roaded. Maintain 60 percent or higher elk habitat effectiveness in drainages where less than 25 percent of the roads have been built (USDA Forest Service 1987a, II-21).

How addressed:

Elk habitat effectiveness (EHE) is analyzed, displayed, and discussed for the existing condition and the alternatives in the EA Chapter 3.5.7 (A). A project-specific Forest Plan amendment would be required because neither of the alternatives meet the EHE standard in all third-order drainages. The proposed project-specific EHE amendment is included in EA Chapter I. Analysis of the EHE amendment is included in EA Appendix B.

The habitat needs of sensitive species, as listed by the Regional Forester, will be considered in all project planning (USDA Forest Service 1987a, II-21).

How addressed:

Habitat needs of sensitive species thought to be affected by motorized recreation in the project area were discussed briefly in the EA Chapter 3, Section 3.5.3 (A), and as part of the individual species sections in Section 3.5.6. The proposed action would have very minor effects to vegetative habitat because most routes already exist on the ground. Effects analysis generally focuses on disturbance impacts of motorized recreation to wildlife species, which can affect the way that species utilize available habitat.

Management Area (MA) Standards

Management Areas 1, 2, 3a, 3b, 3c:

Maintain elk habitat effectiveness through road closures as specified in the Forest-wide Standards in Chapter II (Lyon, 1983). (USDA Forest Service 1987a, III-4, 10, 17, 25, 59, and 61).

How addressed:

Elk habitat effectiveness (EHE) is analyzed, displayed, and discussed for the existing condition and the alternatives in the EA Chapter 3, Section 3.5.7 (A). A site-specific Forest Plan amendment would be required because neither of the alternatives meet the EHE standard in all third-order drainages. The proposed site-specific EHE amendment is included in EA Chapter I.8.9. Analysis of the EHE amendment is included in EA Appendix C.

B. Endangered Species Act

The Endangered Species Act requires that any federal agency action does not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat.

Alternative A would not affect any threatened or endangered wildlife species because it would not change existing conditions. Alternative B would not affect yellow-billed cuckoos because not suitable habitat for this species exists within the project area. Alternative B would affect a small amount of existing snowshoe hare habitat, and thus could have very minor impacts to transient Canada lynx that may traverse the project area. Neither of the alternatives would affect critical habitat for any listed species, since no critical habitat for any listed wildlife species occurs on the Forest. **Both of the alternatives** would be consistent with applicable laws and regulations pertaining to threatened or endangered species.

C. Migratory Birds

President Clinton issued an Executive Order on "Responsibilities of Federal Agencies to Protect Migratory Birds" on January 10, 2001. In direct response to the Executive Order, the Forest Service and USFWS entered into a Memorandum of Understanding to strengthen migratory bird conservation through enhanced collaboration between the two agencies, in coordination with state, tribal, and local governments. **All of the action alternatives** would contribute to the conservation of migratory birds because they would reduce motorized disturbance effects to birds nesting near open routes.

The land bird monitoring program on the Bitterroot National Forest responds to regulatory direction to maintain viable populations of all native and desired non-native wildlife in habitats distributed throughout their geographic range on National Forest System lands. Although population changes are difficult to ascertain because the longest standing records are for only 20 years, and most of the monitoring work has been accomplished in the last 15 years, the monitoring program has not revealed declines in any species (PF-FPMON-001).

3.5.9 DETERMINATION OF EFFECTS FOR THREATENED, ENDANGERED AND SENSITIVE WILDLIFE SPECIES

NORTHERN REGION

BIOLOGICAL ASSESSMENT/EVALUATION FOR TES WILDLIFE SPECIES
SUMMARY OF CONCLUSION OF EFFECTS

Project Name: Darby Lumber Lands Watershed Improvement and Travel Management Project

Species	Alt. A	Alt. B
T & E Species		
Canada Lynx	NE	NLAA
Yellow-billed Cuckoo	NE	NE
Sensitive Species		
Bald Eagle	NI	NI
Bighorn Sheep	NI	NI
Black-backed Woodpecker	NI	NI
Coeur d'Alene Salamander	NI	NI
Fisher	NI	NI
Flammulated Owl	NI	NI
Gray Wolf	NI	MIIH
Long-eared Myotis	NI	NI
Long-legged Myotis	NI	NI
North American Wolverine	NI	MIIH
Northern Bog Lemming	NI	NI
Northern Leopard Frog	NI	NI
Peregrine Falcon	NI	NI
Western Big-eared Bat	NI	NI
Western Toad	NI	MIIH

Prepared by: _/s/ *David W. Lockman*_____ Date: March 24, 2015

DAVID W. LOCKMAN
BNF North Zone Wildlife Biologist

NI = No Impact
MIIH = May Impact Individuals or Habitat, but Will Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species
LIFV* = Likely to Impact Individuals or Habitat with a Consequence that the Action May Contribute Towards Federal Listing or Result in Reduced Viability for the Population or Species
BI = Beneficial Impact
NLJ = Not Likely To Jeopardize the Continued Existence of the Species

3.6 RARE PLANTS

An evaluation of threatened species, endangered species, sensitive species, plant species of concern, and Forest plant species of concern was conducted for the Darby Lumber Lands Project in order to determine species of rare plants most likely to be affected by the proposed activities.

3.6.1 OVERVIEW OF RELEVANT LAWS, REGULATIONS, AND POLICIES

A. Consistency with the Bitterroot Forest Plan and Other Regulatory Direction

The Forest Plan specifies (p. II-21) that vascular plants identified as rare, pending study, or proposed as threatened or endangered will be identified and protected. Stated goals of Forest Service policy (FSM 2670.22 and 2670.32) are to maintain the population viability of sensitive species across their geographic range, implement management practices to ensure that sensitive species do not become threatened or endangered because of Forest Service actions, and minimize impacts to all species whose viability has been identified as a concern. Information on the number of plants required for maintenance of viable populations is not available. Therefore, a conservative approach is taken when determining the effects of management activities. In this project, all of the alternatives would be consistent with the Forest Plan and Forest Service policy.

B. National Forest Management Act of 1976

The National Forest Management Act of 1976, as amended, directs the Forest Service to provide for diversity of plant and animal communities and requires the development and implementation of a resource management plan for a National Forest.

C. Forest Service Manual 2600 Wildlife, Fish and Sensitive Plant Habitat Management

Forest Service Sensitive Species Policy (FSM 2670) directs national forests to assist states in achieving conservation goals for endemic species; complete biological evaluations of programs and activities; avoid and minimize impacts to species with viability concerns; analyze the significance of adverse effects on populations or habitat; and coordinate with states and USFWS. The Forest Service Manual (2670. 5) further defines sensitive species as those plant species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trend in numbers, density or habitat capability that would reduce a species distribution. By analyzing the effects on sensitive rare plants through this document, and ensuring that sensitive plants are not trending toward federal listing as a result of project implementation, the project will be in compliance with the manual direction.

D. Endangered Species Act

The Endangered Species Act of 1973, (as amended (16 U.S.C. 1531 *et seq*) Section 2, directs federal agencies to conserve endangered and threatened species and to ensure that actions authorized, funded, or carried out by these agencies are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of their critical habitats. Within the state of Montana, water howellia (*Howellia aquatilis*), Spalding's catchfly (*Silene spaldingii*), and Ute ladies' tresses (*Spiranthes diluvialis*) are listed as threatened under the Endangered Species Act (USDA, Forest Service 2011a). There are no plants listed as endangered, and whitebark pine (*Pinus albicaulis*) is a candidate for federal listing (USDI, FWS 2011a). Of the species listed or candidate, only whitebark pine occurs on the Bitterroot National Forest. Whitebark pine does not occur within the analysis area. The project area was surveyed and analyzed for habitat and threatened, endangered, and candidate plants to

ensure the project does not jeopardize the continued existence of any species. Therefore, this project will be in compliance with the act.

E. National Environmental Policy Act of 1969

The National Environmental Policy Act requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. Impacts to rare plants have been evaluated under four different alternatives and are presented in this document, therefore meeting the National Environmental Policy Act of 1969.

3.6.2 AFFECTED ENVIRONMENT

A. Existing Condition

No plants listed as threatened, endangered, or candidates for listing are found in the Darby Lumber Lands project area and will not be analyzed or discussed in this analysis. Sensitive plants are species, subspecies or varieties of plants whose populations or habitat capability have current or predicted downward trends (FSM 2670.5). Species of Concern are determined by the State of Montana to be rare or threatened plants or plants with declining populations. Sensitive plants and plant Species of Concern may have a restricted range in Montana, or they may be sparsely distributed over a larger area. Plants designated as 'species of concern' by the Montana Natural Heritage Program (MTNHP) include species that are listed as threatened, endangered, or sensitive by Federal agencies.

The Bitterroot National Forest currently analyzes and manages for 108species of listed sensitive plants (USDA Forest Service 2011) and three species that are forest species of interest because of tribal interest in these plants. These 111 plants are known, suspected, or have potential to occur on the Bitterroot National Forest, due to habitat being present.

Based on the project methodology, the Forest Botanist compiled a list of rare plant species and forest species of interest, which were known or had the potential to occur in the Darby Lumber Lands project area (Table 1). The plant species were surveyed in the summer of 2012. Table 3.6-1 lists the species found in the project area and the Montana Natural Heritage Species Rankings are displayed in Table 3.6-2. The Montana Natural Heritage Species Rankings are a standardized ranking system to denote global (range-wide) and state status (NatureServe 2006). Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based on available information.

Table 3.6- 1: Plant species found in the project area.

SENSITIVE PLANT SPECIES			
SPECIES	**COMMON NAME**	**POPULATIONS FOUND**	**STATUS**
Allium parvum	Dwarf onion	6	G5/S3
Penstemon lemhiensis	Lemhi penstemon	1	G3/S3

Table 3.6- 2: Montana Natural Heritage Species Rankings. Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based upon available information.

G1/S1	At high risk of extinction or extirpation in the state because of extremely limited and/or

	rapidly declining population numbers, range and/or habitat.
G2/S2	At risk of extinction or extirpation in the state because of very limited and/or potentially declining population numbers, range and/or habitat.
G3/S3	Potential risk of extinction or extirpation in the state because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
G4/S4	Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.
G5/S5	Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

Populations of rare plants found within the project area were not found on road or trails proposed for treatment. All populations are more than a half of a mile from any new connector routes proposed.

3.6.3 ENVIRONMENTAL CONSEQUENCES

A. Methodology

The project area was surveyed in 2012 for rare plant species by the forest botanist and biological science technicians. General and intensive surveys were conducted in the project area. Table 3.6-3 lists the habitats for rare plants found within the project area.

Montana Natural Heritage Program database, aerial photographs, spatial information, and Bitterroot National Forest records were reviewed to identify known rare plant populations in or near the proposed project area. The project area was also surveyed for habitat that might be suitable for sensitive plants or plant species of concern. The plant list and plant habitats reviewed before field survey is included in the project file (PF-BOTANY-001 through 003). These documents were based on this data and a table was compiled showing rare plant species that were known to occur within the project area or had the potential to occur in the area.

This Biological Evaluation was prepared based on presently available information. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact rare plants in a manner or to an extent not previously considered, a new or revised Biological Evaluation may be required.

Table 3.6- 3: Potential Plants and Plant Habitat in the Darby Lumber Lands Project Reviewed for Survey. The Effects Determination[1] is provided based on the presence of plants or their habitat and potential effects of project activities.

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
THREATENED AND ENDANGERED SPECIES						
Howellia aquatilis Water howellia	Low elevation wetlands surround by deciduous trees.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Pinus albicaulis White bark pine	Mixed conifer stands at treeline.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Silene spaldingii Spalding's catchfly	Open mesic grasslands in valleys and foothills.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Spiranthes diluvialis Ute ladies' tresses	Alkaline wetlands, swales and old, meander channels.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
VASCULAR SENSITIVE SPECIES						
Allium acuminatum Taper-tip onion	Grasslands and ponderosa pine.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Allium parvum Dwarf onion	Grasslands and open ponderosa pine.	SPECIES: Yes HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Arabis fecunda *Sapphire rockcress*	Calcareous soils.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Astragalus paysonii *Payson's milk-vetch*	Found in granite and sandy soils in disturbed areas such as road cuts and edges of clear cuts (ID side).	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Athysanus pusillus Sandweed	Vernally moist rocky areas.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Carex paupercula *Poor sedge (Idaho only)*	Fens and Bogs (ID side).	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Castilleja covilleana Rocky Mountain paintbrush	Grasslands, ponderosa pine, and Rocky alpine.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Clarkia rhomboidea Common clarkia	Open Ponderosa pine stands.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Cypripedium parviflorum Yellow lady's slipper	Riparian areas.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Douglasia idahoensis Idaho douglasia (Idaho only)	Subalpine zones (ID side).	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Drosera anglica English sundew	Fens and Bogs.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Dryopteris cristata Crested shield-fern	Fens, Bogs, and Wetland areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Epipactis gigantea Giant helleborine	Riparian and Thermal sites.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Erigeron asperugineus Rough fleabane	Alpine Rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Erigeron evermannii Evermann's fleabane	Alpine Rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Eupatorium occidentale *Western boneset*	Talus sites.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Glossopetalon spinescens *Green-bush*	Granite outcrops.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Halimolobos perplexa Perplexed halimolobos	Grasslands, Sagebrush, and Open Ponderosa pine stands.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Happlopappus macronema var. *macronema* *Whitestem goldenbush*	Alpine Rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Heterocodon rariflorum Western pearl-flower	Canyon seeps.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Idahoa scapigera Scalepod	Vernally moist rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Mimulus ampliatus Stalk-leaved monkeyflower	Open seeps and vernally moist soil along slopes, cliffs, and streams from the valleys to the subalpine zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Mimulus nanus Dwarf purple monkey flower	Grasslands, Sagebrush, and Open Ponderosa pine stands.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Mimulus primuloides *Primrose monkeyflower*	Fens and Bogs.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Penstemon lemhiensis Lemhi penstemon	Grasslands, Ponderosa pine stands, and Sagebrush areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Penstemon payettensis Payette penstemon	Grasslands, Ponderosa pine stands, and Sagebrush areas.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Physaria humilis *Bitterroot bladderpod*	Alpine Rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Saxifraga tempestiva *Storm saxifrage*	Alpine Vernal Rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Scheuchzeria palustris *Pod grass*	Fens and Bogs.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Tonestus aberrans *Idaho goldenweed*	Granite outcrops.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Trifolium eriocephalum Woolly-head clover	Mixed conifer and Open meadows.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Trifolium gymnocarpon Hollyleaf clover	Grasslands, Ponderosa pine, and Doug fir stands.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Veratrum californicum *California false hellebore*	Riparian areas.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
NON-VASCULAR SENSITIVE SPECIES						
SPECIES	**HABITAT**	**PRESENCE**	**EFFECTS DETERMINATION**			
			ALT 1	**ALT 2**	**ALT 3**	**ALT 4**
Meesia triquetra 3-Angled threadmoss	Fens and Bogs.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Nodobryoria subdivergens *Old Man's beard*	Alpine rocky areas.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
VASCULAR SPECIES OF CONCERN						
SPECIES	**HABITAT**	**PRESENCE**	**EFFECTS DETERMINATION**			
			ALT 1	**ALT 2**	**ALT 3**	**ALT 4**
Allium columbianum Columbian onion	Found in moist swales along vernal ponds and streams in valleys.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Allium simillimum Dwarf onion	Found in meadows and grasslands in montane and lower subalpine zones in moist gravelly soil.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Arctostaphylos patula Greenleaf manzanita	Rocky soil in open coniferous forests in the montane zone.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Calamagrostis tweedyi *Cascade reedgrass*	Found in seral stage Douglas Fir and subalpine fir forests in the montane zone.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Carex scoparia Pointed broom sedge	Vernally wet, sparsely vegetated soil found around ponds, rivers, and streams in valleys and plains.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Centunculus minimus Chaffweed	Vernally wet, sparsely vegetated soil found around ponds, rivers, and streams in valleys and plains.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Collomia debilis var. *camporum* *Alpine Collomia*	Found on low elevation scree, talus, and rocky slopes near valley bottoms in the montane zone.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Cyperus bipartitus *Shining flat sedge*	Wet gravelly shores of rivers, lakes, and ponds.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Draba daviesiae *Bitterroot Draba*	Found on rocky slopes and talus near or above timberline.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Erigeron linearis *Linear-leaf fleabane*	Dry rocky soil often found with sagebrush.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Eriogonum capistratum var. *muhlickii* *Muhlick's buckwheat*	Talus slopes, cliffs, and rocky ridges in subalpine to alpine zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Ipomopsis minutiflora *Small-flower standing cypress*	Fine textured soils, in sparsely vegetated open slopes with sagebrush.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Juncus covillei *Coville's rush*	Variety *covillei* found in moist, gravelly, or sandy soil along major water courses in valley zones. Variety *obtusatus* found in moist to wet, seepy soil of slopes and meadows in montane and subalpine zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Lewisia columbiana *Columbian Bitterroot*	Moist rock crevices along streams.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Listera borealis *Northern twayblade*	Grows in seepy, marshy places along cold-air drainages, often where	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Mimulus floribundus *Floriferous monkeyflower*	Moist to wet places in lower elevations.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Najas guadalupensis *Guadalupe water-nymph*	Submerged in shallow freshwater of sloughs, ponds, and reservoirs in	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Pedicularis contorta var. *rubicunda* *Selway coil-beaked lousewort*	Ridgetops and meadows in the upper subalpine and alpine zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Penstemon flavescens Yellow beardtongue	Open or wooded, often rocky slopes in mountains.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Ribes triste *Swamp red currant*	Forest openings in moist soil in montane to subalpine zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Rotala ramosior *Toothcup*	Open, wet, gravelly soil around ponds and sloughs in the valley zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Satureja douglasii *Yerba buena*	Found in partial to deep shade in moist forests in the montane zones.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Wolffia columbiana *Columbia water-meal*	Fresh shallow ponds and sloughs in valleys.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
NON-VASCULAR SPECIES OF CONCERN						
SPECIES	**HABITAT**	**PRESENCE**	**EFFECTS DETERMINATION**			
			ALT 1	**ALT 2**	**ALT 3**	**ALT 4**
Dicranum acutifolium *Acuteleaf Dicranum moss*	Found in calcareous soils, on boulders, and rock outcrops.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Grimmia incurva *Curved dry rock moss*	Moist rock.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Hennediella heimii *Heim's Desmatodon Moss*	Found on moist saline or alkaline soils near streams or lakeshores.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Orthotrichum praemorsum *Orthotrichum moss*	Found on rock.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Phascum cuspidatum Toothed Phascum moss	Found on dry soil in open areas among grasses or shrubs.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Psuedocrossidium obtusulum Pseudocrossidium moss	Found on soil and calcareous outcrops 90 - 3,300 ft.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Sphagnum magellanicum Magellan's peatmoss	Found along the edges of bogs or fens.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Syntrichia bartramii *Bartram's tortula moss*	Found on dry soil and rocks in mid to high elevations.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Syntrichia papillosissima	Found on dry soil and rocks in mid to high elevations.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Lobaria linita *Cabbage lungwort lichen*	Montane to alpine habitats. Found on alpine sod or mossy rocks.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Normandina pulchella *Elf-ear lichen*	Found on bark and mosses in moist habitats.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Parmeliella triptophylla *Lead lichen*	Found in moist habitats on tree bases, rocks, and moss found other rocks.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Peltigera hydrothyrid *Hydrothyria lichen*	Found on rocks and gravel in mountain streams and springs without seasonal fluctuations.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Ramalina obtusata *Hooded Ramalina lichen*	Found on tree and shrub bark in low elevation riparian forests.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
FERN AND FERN ALLIES SPECIES OF CONCERN						
SPECIES	**HABITAT**	**PRESENCE**	**EFFECTS DETERMINATION**			
			ALT 1	**ALT 2**	**ALT 3**	**ALT 4**
Botrychium lunaria Common moonwort	Montane meadows and grasslands in disturbed sites from low to moderate elevations.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Botrychium pinnatum Northern moonwort	Wet to moist grassy slopes, streambanks, roadsides, and mossy woods in mountains. In Idaho found in shaded cedar forests.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

SPECIES	HABITAT	PRESENCE	EFFECTS DETERMINATION			
			ALT 1	ALT 2	ALT 3	ALT 4
Botrychium simplex Least moonwort	Montane meadows and grasslands in disturbed sites from low to moderate elevations.	SPECIES: No HABITAT: Yes	NI NI	NI NI	NI NI	NI NI
Polystichum scopulinum Mountain holly-fern	Moist rock crevices in subalpine zones or on moist rocks along rivers in valleys.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
FOREST SPECIES OF INTEREST						
SPECIES	**HABITAT**	**PRESENCE**	**EFFECTS DETERMINATION**			
			ALT 1	**ALT 2**	**ALT 3**	**ALT 4**
Camassia quamash Small camas	Found in wet meadows and along streams.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Lewisia pygmaea var. nevadensis Nevada lewisia	Moist meadows and Open forests.	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI
Lewisia rediviva var. rediviva *Bitterroot*	Rocky Open Dry Soils	SPECIES: No HABITAT: No	NI NI	NI NI	NI NI	NI NI

[1] Effects Determinations are:
NI = No Impact
MIIH = May Impact Individuals or Habitat, but Will Not Likely Result in a Trend Toward Federal Listing or Reduced Viability for the Population or Species.
LIFV* = Likely To Impact Individuals or Habitat with a Consequence that the Action may Contribute Towards Federal Listing or Result in Reduced Viability for the Population or Species.
BI = Beneficial Impact
*Trigger for a Significant Action

3.6.4 INCOMPLETE AND UNAVAILABLE INFORMATION

Since our knowledge of most of the species on the Bitterroot National Forest rare plant lists is limited, it is important to be aware that species may be found in areas outside of what is currently thought to be "suitable" habitat. Therefore, during the course of field surveys, plant species taken out of consideration due to distribution or habitat unsuitability were surveyed for cursorily.

3.6.5 SPATIAL AND TEMPORAL CONTEXT FOR EFFECTS ANALYSIS

A. Spatial Context

The spatial context for the analysis of direct and indirect effects includes Forest Service lands within the project area with a focus on treatment units and associated activities because impacts to rare plants are more likely to occur where project treatments are planned. The cumulative effects analysis spatial bounds are the same as for direct/indirect effects.

B. Temporal Context

The temporal context immediately follows treatment until recovery of disturbances caused by project activities. The comparison of effects is based on the existing condition, which reflects the culmination of effects from past management. The recovery of individual plants and populations after disturbance is species-specific and may depend on the disturbance type and its effects to the microsite, the tolerance of the species to disturbance, and the species rooting characteristics (i.e. rhizomes, taproots, bulbs, and corms). Following project implementation, vegetation conditions may be suitable for some rare plant species to become established or expand their populations, while other species may take between 50 and 100 years before the tree and shrub canopy cover conditions that provide suitable habitat.

3.6.6 Connected Actions, Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Fire suppression, logging, road maintenance and construction, trails have impacted rare plant populations within the project area. Invasive plant control and road maintenance are currently occurring and likely to occur in the future.

A. Commercial Harvest

Timber harvesting has occurred on the Bitterroot National Forest beginning in 1845. Most activities occurred after the railroad was built in the late 1800s. Timber harvesting decreases canopy cover and increases light to the forest floor. This may be beneficial for some sensitive species, but may have adverse effects for sensitive species that require canopy cover. Over time, changes in forest structure alter native vegetation and rare species habitat. In many cases, timber harvesting creates stand changes similar to wildland fire; however, the pattern and distribution of forest size classes has drastically shifted from historical patterns that were created under natural disturbance regimes (see vegetation report).

B. Fire Suppression/Wildfire

Wildfire has been suppressed for much of the past 100 years. Impacts from conifer encroachment and succession have occurred and are continuing to occur in rare plant habitats (Keane and Parsons 2010; Heidel and Shelly 2001). Future wildfires or prescribed burns, if allowed, will likely reduce conifer and shrub cover in rare plant habitats and likely encourage the establishment of species that need open habitat (Keane and Parsons 2010; Heidel and Shelly 2001). Whereas continued fire suppression will likely allow further conifer encroachment and progression to more shade tolerant species, thus eventually resulting in a community type conversion.

Fire suppression activities reduce rare plant habitats when individual plants or the habitats are removed or trampled by heavy equipment.

C. Invasive Plant Control

Invasive plant control activities will continue as described in the Invasive Plants Report. Current communication between the Botanist and the Range/Weeds staff regarding rare plant locations reduces or eliminates the threat of inadvertent spraying of rare plants.

D. Road Maintenance

Road maintenance will continue when needed. Removal of individuals is not likely to occur at the present because rare populations do not occupy habitat in close proximity to roads.

3.6.7 Alternative A – No Action

A. Direct and Indirect Effects

Currently there are unauthorized trails created in areas that do not contain rare plant habitat. There is a risk for unauthorized trails being created within rare plant habitat in the project area. Rare plant habitat is found throughout the project area and rare plant populations are present within the project area. These sites are susceptible to direct damage and indirectly through unauthorized OHV use. After a single pass on an OHV, annual plants remained intact, however after ten passes most annuals were destroyed (Webb, 1983, p. 50-79). Studies have found that not only are plants directly affected from the contact of the vehicle, but that it also changes the soil composition (Adams et. Al. 1982). Not only has plant size been affected, but the ability for plants to take hold in areas where vehicles have made several passes. There are also cases that show a change in regime from native species to invasive species. Off Highway Vehicles have also been shown to create fugitive dust and other airborne pollutants which can negatively affect plants. Fugitive dust is a type of nonpoint source air pollution- small airborne particles that do not originate from a specific point (University of Missouri Extension). The layer of dust that covers the plants and stomata inhibits the photosynthetic, respiration, and transpiration processes. The effects in turn inhibit root growth, plant growth rate, size, reproduction, and survival.

Without proper trail construction and layout to guide users as to where to ride, users may create new trails in rare plant populations. The no action alternative would result in direct and indirect effects to rare plant species habitat since there are currently unauthorized trails affecting these species.

3.6.8 Action Alternative – Proposed Actions/ Effects

A. Design Features and Mitigation Measures

- Promote revegetation with native plant species:
    - Use local seeding guidelines for detailed procedures and appropriate mixes. Refer to the Forest Seed Mix to determine which species to use (FSM 2070.3).
- Protect sensitive plant populations during harvest operations:
    - Rare plant populations would be identified and buffered from project activities. Buffer widths are based on habitat requirements of the specific plant populations. Buffered rare plant populations will be mapped and identified in the field.
    - Machinery and tree felling would not occur within the identified buffer.
- Promote revegetation with native plant species:
    - Treat areas with high-risk invasive species infestations (as defined in Regional Risk Assessment Factors and Rating protocol).
    - Treat invasive species after project implementation.
- Reduce the risk of weed spread:
    - Remove all mud, dirt, and plant parts from all equipment before moving into the project area. Cleaning must occur off National Forest lands (this does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area).
    - All gravel and borrow sources would be inspected and approved, by the Forest Noxious Weed Coordinator/Forest Botanist, before use and transport. The source will not be used if invasive species present at the pit are not found at the site of intended use. If invasive species are present, they must be treated before transport and use.

3.6.9 Direct and Indirect Effects

Threatened and Endangered species have not been found in the project area to date, therefore there would be no direct or indirect effects to Threatened and Endangered species. There were also no rare plant populations found in proposed treatment areas. However, Sensitive species were found in the project area.

The potential is there for off highway vehicles users to continue to create unauthorized trails. The action alternative offers the ability to create and re-route proper trails placed in appropriate areas. These would be available for users to ride on and eliminate their need to create their own trails. Treatments would also reduce the availability of intact, but closed roads that may become unauthorized routes by recontouring and closing them at junctions with open routes. Therefore, implementation would reduce/eliminate the effects and they would not contribute to the listing of vascular plants and non-vascular plants rare plant species.

Due to design features applied to protect rare plants and their potential habitat found in the project area during surveys, there would be no direct and minimal indirect effects to these species. Therefore, implementation would not contribute to the listing of vascular plants and non-vascular rare plant species.

3.6.10 COMPLIANCE WITH FOREST PLAN AND OTHER RELEVANT LAWS, REGULATIONS, POLICIES AND PLANS

Table 3.6- 4: Compliance with forest plan and other relevant laws, regulations, policies, and plans.

REGULATORY REQUIREMENT	PROPOSED ACTION
Bitterroot Forest Plan	The Forest plan has been followed by identifying and protecting rare plants in the project area.
Forest Service Manual 2600 Wildlife, Fish and Sensitive Plant Habitat Management	Manual 2600 directs the Forest Service to complete biological evaluations, analyze the significance of adverse impacts, and avoid or minimize impacts. This biological evaluation serves as the analysis of impacts and includes measures to avoid or minimize impacts to rare plants where feasible, and is therefore in compliance with the Manual direction.
Endangered Species Act	There are no federally listed plant species within the project area, therefore this project will not be jeopardizing any listed species and is in compliance with the Act.
National Environmental Policy Act of 1969	This document considers and analyzes the potential direct, indirect, and cumulative impacts to rare plants through a cause-effect analysis based on presence of species and the potential effects of alternatives. This analysis established that there are no extraordinary circumstances that would lead to further analysis and is therefore in compliance with the Act.

3.7 NOXIOUS WEEDS

The introduction of non-native, invasive plant species (invasive plants) continues to reduce the ecological integrity and economic productivity of natural systems and agriculture on a worldwide basis. Invasive plant species create more than $35 billion in economic losses and treatment costs annually in the United States (Pimental, et al. 2005). Invasive plants, also called noxious weeds, have disrupted natural processes on nearly 100 million acres in the United States and are spreading at an estimated rate of 14 percent annually (USDA Animal and Plant Health Inspection Service 2003).

Invasive plants are non-native, aggressive plants brought to North America either accidentally or intentionally. These species out-compete the native species for water, nutrients, and light which in turn

crowds out and reduces populations of native plants, and of particular concern, rare plants. Invasive plants degrade recreation areas, increase fire risk, reduce forest health, decrease wildlife habitat quality, invade croplands and pastures, and decrease of livestock forage availability. Certain invasive plants are potentially toxic to humans and animals. Invasive plant seeds can remain viable for many years and the a number of the perennial invasive species have extensive root systems which can re-sprout even after the tops of plants have been removed. Seed viability and extensive persistent root systems make early detection of invasive plants critical to eradicate them and control their spread. Early detection of invasive plants and rapid treatment response increases the chance that populations can be eradicated and will not become established. Invasive plants have no natural predators at the infestation site since they are removed from their native habitats and natural biological control agents. The lack of biological control agents gives invasive plants a competitive edge over native plants and makes it very difficult to control the invasive plants. Invasive plants are primarily found in disturbed areas, often along roads and trails. Invasive plants were essentially nonexistent before the arrival of European settlers. Native vegetation and habitats would have been more intact in the Bitterroot Valley.

Bromus tectorum (cheatgrass), Centaurea stoebe ssp. macranthos (spotted knapweed), Cirsium arvense (Canada thistle), Euphorbia esula (leafy spurge), Hypericum perforatum (St. John's wort), Leucanthemum vulgare (oxeye daisy), Cynoglossum officinale (houndstongue) and Ranunculus acris (tall buttercup) are species known to occur within the project area. Echium vulgare (blueweed) and Chondrilla juncea (rush skeletonweed) are two new invaders of highest concern and priority to the vicinity of the project. Known infestations of these two species occur on nearby private land. Treating and monitoring invasive plant populations is a Forest priority. Some of the invasive plant populations are currently small and eradication from the project area is possible. Roads are regularly treated with herbicides and biocontrols to meet the containmen, suppression and eradication objectives as approved in the Noxious Weed Treatment Project Record of Decision (USDA Forest Service 2003a).

3.7.1 Overview of Relevant Laws, Regulations, and Policies

A. Consistency with the Bitterroot National Forest Plan

Goals and objectives on the Bitterroot National Forest Plan (Forest Plan, FP) states that noxious weeds (invasive plants) will be controlled to protect resource values (FP p. II-3 & II-29. In this project, both of the alternatives would be consistent with the Forest Plan.

Direction and authority for invasive plant management is provided in the National Forest Management Act (PL94-588), Federal Land Policy and Management Act (PL 94-579), Carlson-Foley Act (PL-583), Federal Noxious Weed Control Act (PL-629) and the Montana Weed Management Plan (2001).

B. National Forest Management Act of 1976

The National Forest Management Act of 1976 as amended directs the FS to provide for diversity of plant and animal communities and requires the development and implementation of a resource management plan for a National Forest. This Act applies to the Darby Lumber Lands Project by setting the stage for the inclusion of provisions for the protection of plant diversity in site-specific projects. The project design criteria in the Darby Lumber Lands Project that prescribe control and monitoring actions for invasive plants/noxious weeds will protect the ecological health and diversity of native plant and animal communities.

C. Bitterroot National Forest Land and Resource Management Plan (USDA FS 1987)

The Bitterroot Forest Plan (1987) guides natural resource management activities and established a goal for Forest-wide management of noxious weeds that directs the Forest to "control noxious weeds to protect

resource values and minimize adverse effects on adjacent private lands". The Forest Plan applies directly to the Darby Lumber Lands Restoration Project by requiring design criteria that will accomplish noxious weed control.

D. Federal Noxious Weed Act of 1974 as amended in 1990

Under the 1990 amendment to the Federal Noxious Weed Act, federal agencies are directed to enter into agreements with appropriate state and local agencies to coordinate the management of noxious weeds. Specifically, the Act calls for federal agencies to: a) develop and coordinate a program to control such plants on the agency's land; b) complete and implement cooperative agreements with the States regarding undesirable plants on agency land; and c) establish integrated management systems to control or contain undesirable plants targeted under the cooperative agreements.

This Act applies directly to the Darby Lumber Lands Project by promoting the development and implemention of the terms of the current Participating Agreement with Ravalli County to control noxious weeds/invasive plants on the National Forest in the project area and to prevent their spread onto private lands that lie immediately to the east of the project area.

E. The Bitterroot National Forest Noxious Weed Treatment Project Environmental Impact Statement and Record of Decision, March 2003

The Bitterroot National Forest Noxious Weed Treatment Project Environmental Impact Statement and Record of Decision (March 2003) implemented Forest Plan direction and authorized the treatment of invasive plants on areas of the Bitterroot National Forest. The EIS/ROD includes the area encompassed by the Darby Lumber Lands Restoration Project and the associated road system in the portions of the Bitterroot Forest that were analyzed, approved and prescribed for noxious weed/invasive plant prevention, control and treatment. Design criteria for invasives work in the Darby Lumber Lands Project will follow the guidelines provided in the 2003 EIS.

F. The Montana Noxious Weed Control Act

The Montana Noxious Weed Control Act defines a noxious weed as "any exotic plant species established or potentially could be established in the State which may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses, and is further designated as either a state-wide or county-wide noxious weed" (MCA 7-22-2101).

G. Executive Order 13112 (1999)

Executive Order 13112 (1999) directs all federal agencies to conduct activities that reduce invasive plant populations and provide for their control. The EO applies directly to the Darby Lumber Lands Restoration Project by providing additional agency justification for design criteria or actions associated with the project that result in the reduction and control of invasive plants in the project area.

H. National Strategic Framework for Invasive Species Management (August 2013)

The US Forest Service developed a National Strategic Framework for Invasive Species Management (August 2013) to assist in protection of our Nation's terrestrial and aquatic ecosystems. This Framework supersedes the agency's 2004 Invasive Species Strategy and Implementation Plan and provides a guide for Forest Service invasive species management activities.

I. Forest Service Manual (FSM) 2900

Forest Service Manual (FSM) 2900 establishes code and a new manual for Invasive Species Management. FSM 2900 sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens).

The 2900 Manual applies directly to the effects analysis and design criteria of the Darby Lumber Lands Restoration Project in the following ways:

1) the manual directs that management activities will employ actions that will help contain, reduce, or remove infestations of invasive species; and

2) where necessary, will implement restoration, rehabilitation, and/or revegetation activities to prevent or reduce the likelihood of the establishment or spread of invasive species.

3.7.2 EXISTING CONDITION

The project area was surveyed intensively for invasive plants during 2012-2014 field seasons. Routine inventory and monitoring occurs concurrently with approved treatment work in and around the project area.

Table 3.7- 1: Invasive Plants found in or adjacent to the Darby Lumber Lands Restoration Project Area.

SCIENTIFIC NAME	COMMON NAME	LISTING STATUS
Chondrilla juncea	Rush skeletonweed	Priority 1B
Echium vulgare	blueweed	Priority 1B
Ranunculus acris	Tall Buttercup	Priority 2A
Centaurea stoebe	Spotted Knapweed	Priority 2B
Cirsium arvense	Canada Thistle	Priority 2B
Cynoglossum officinal	Houndstongue	Priority 2B
Euphorbia esula	Leafy Spurge	Priority 2B
Hypericum perfoliatum	St. Johnswort	Priority 2B
Leucanthemum vulgare	Oxeye Daisy	Priority 2B
Potentilla recta	Sulfur Cinquefoil	Priority 2B
Bromus tectorum	Cheatgrass	Priority 3

Table 3.7- 2: Species are listed using the guidelines from the state of Montana.

Priority 1A	These weeds are not present in Montana. Management criteria will require eradication if detected; education; and prevention
Priority 1B	These weeds have limited presence in Montana. Management criteria will require eradication or containment and education.
Priority 2A	These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.
Priority 2B	These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.

Priority 3	Regulated plants (Not Montana listed noxious weeds): These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education, and prevention to minimize the spread of the regulated plant.

3.7.3 General Descriptions and Control Methods for Invasive Plants

Rush Skeletonweed (Chondrilla juncea)

Scattered infestations of rush skeletonweed were detected in the Fall of 2014 on nearby privately owned rangelands located east of Darby, Montana and bordering the Bitterroot National Forest. This plant is classified as a new invader of highest concern. The seed of the plant readily disperses by wind in a manner similar to dandelion seed. The ability of the plant to move its seed long distances makes early detection and eradication of the specie a high priority for Ravalli County and the State of Montana. A collaborative detection and eradication effort was mounted immediately by the Ravalli County Noxious Weed Department and the Bitterroot National Forest. The species most readily invades dry grassland and open overstory dry site timber habitat types. It is a long-lived perennial that forms a persistent rhizomatous root system from which it can regenerate and develop new seed producing plants. It is aggressive and capable of forming extensive dominant monoculture stands that reduce native plant densities and diversity. Rush skeletonweed is best controlled by application of the herbicide aminopyralid. Complete removal of the aerial portion and root system of 1st year plants (hand grubbing) is also effective. Close monitoring of the project area for pioneering infestations of this species will be an ongoing effort regardless of any action on the Darby Lumber Lands Project.

Blueweed (Echium vulgare)

Blueweed is a long-lived perennial that forms a deep taproot. It has established several persistent monoculture blocks on nearby private land and is thought to have established there in the 1960s after being transported to the ranch on equipment from the State of Washington. It spreads and establishes through seed movement by water, animals, people and vehicles. Hand grubbing of the complete plant in its juvenile stage is effective as is application of the herbicide metsulfuron. Close monitoring of the project area for pioneering infestations of this species will be an ongoing effort regardless of any action on the Darby Lumber Lands Project.

Cheatgrass (Bromus tectorum)

Cheatgrass is known to occur in scattered or patchy distribution on many open grasslands and roadsides. This plant can alter the ecosystem process and change structure and function of plant communities. The ability of this plant to dry completely, accumulate litter, and its structure make it extremely flammable. Cheatgrass invasion has increased the frequency of fires from once every 60 to 110 years to once every 3 to 5 years on millions of acres of rangeland in the Great Basin (Whisenant 1990). The threat of invasion of many open grasslands and areas on the Forest is potentially high, given the amount of fire experienced during the summer of 2000. This species is spread by seed. Cheatgrass typically dries out and disperses seed by mid-June (Table 3).

Spotted Knapweed (Centaurea biebersteinii {C. maculosa})

The Bitterroot National Forest is currently infested with about 274,000 acres of spotted knapweed (USDA Forest Service 2004). It generally occurs below 6,500 feet on the Bitterroot National Forest, except on extreme southern aspects. There is a strong correlation between canopy closure and knapweed coverage; with more sunlight, there is an increased likelihood of infestation. Knapweed infestation is also correlated

with aspect, soil type and the degree of soil disturbance. It is most commonly found on dry, sterile, gravelly, or sandy soils in pastures, and will quickly invade disturbed sites such as road and railroad rights-of-way, waste places, abandoned fields, timber harvest units and overgrazed rangeland. It is not common on cultivated land or on irrigated pasture. Spotted knapweed is not usually found in shaded areas. Ponderosa pine and/or Douglas-fir bunchgrass types, dry shrub communities and scree types are the most susceptible to knapweed invasion (Losensky 1987).

Current treatments for spotted knapweed include mechanical (hand pulling and mowing), biological and chemical. Hand pulling has proven to be up to 35% effective, costs up to $8,498 per acre and can only be accomplished for small areas (USDA Forest Service 2003a). Mowing has been done at recreation sites to make outdoor activities more accessible, although it does not reduce the number of plants. Several biological agents specific to spotted knapweed have been released throughout the Bitterroot National Forest.

The Forest has been releasing biological control agents for 20 years. Biological controls are long-term solutions and no decrease in knapweed populations is expected until the insect populations increase. Biological control agents should decrease knapweed seed production by up to 80% once they become well established. In the meantime, chemical control methods appear to be the most successful treatment for smaller knapweed infestations and containing existing populations (USDA Forest Service 1996a).

Canada Thistle (Cirsium arvense)

Sites susceptible for invasion include disturbed areas, roadsides, and riparian areas. Canada thistle has been known in Ravalli County since 1975. The Bitterroot forest is infested with about 25 acres. Canada thistle reproduces both by seed and by lateral roots; however most of its reproductive energy is put into vegetative propagation (USDA FS 2002). It has an extensive lateral root system that is not easily eradicated once it becomes established, but Forest approved herbicides can be effective.

Houndstongue (Cynoglossum officinale)

There is estimated over 500 acres infested with Houndstongue on the Bitterroot National Forest. Houndstongue is found along roadsides, trails, and disturbed areas such as grazing and timber harvest throughout the Forest. This species is spread by seed. The nutlets have a prickly tissue on them, that act as vectors, by attaching to animals and clothing to help in the spread of this species. The foliage of this plant is toxic to livestock. Houndstongue is listed by the state of Montana as a priority 2B. Infestations seem to be expanding on the Forest (USDA Forest Service 1995b).

Leafy spurge (Euphorbia esula)

Leafy spurge is native to eastern and central Europe, extending into Western Europe and temperate areas in Asia. It was brought to northeastern North America as an ornamental in 1829 and spread rapidly. Leafy spurge seeds have a high germination rate and may remain viable in the soil for at least seven years. Leafy spurge can produce up to 140 seeds starting after its second year (Gucker, Corey L. 2010). Seeds are forcibly ejected up to 15 feet (4.5 m) from mature, dry leafy spurge capsules (Selleck, G. W. 1958). Of the seed bank studies available, very few reported leafy spurge germination after more than 5 years in the soil. During field and laboratory studies conducted at the University of Saskatchewan, Selleck found that some leafy spurge seeds germinated after 5 years in soil, but 99% of germination occurred in the first 2 years of burial. Seeds stored in metal containers at room temperature were still viable after 13 years (Gucker, Corey L. 2010).

Soil disturbances and low vegetation cover are associated with increased leafy spurge seedling establishment, growth, and survival. Vertical seedling root growth is more extensive, and production of

root buds is earlier in areas with low vegetation cover or no associated vegetation than in areas with high cover (Gucker, Corey L. 2010).

Leafy spurge has a very large, highly regenerative root that can extend to 32 feet deep. This deep tap root and ability of leafy spurge to regenerate from small pieces of root, makes it very difficult to eradicate. Leafy spurge is "extremely difficult to control with herbicides" and "almost impossible to control by cultural or physical methods"(Hansen et al. 2004). Many sources indicate that prioritizing control is important to successful management. Weed control handbooks and management guides report that early detection of new and small leafy spurge populations should be a top control priority, because well-established populations are rarely controlled by any contemporary methods (Hansen et al. 2004).

Immediate treatment with herbicides on very small populations can be effective. Biological controls, alone or in combination with herbicides, are probably the most effective methods of managing larger populations of leafy spurge. Mechanical or hand-pulling methods only contribute to the vegetative spread of leafy spurge. Older plants are able to survive fire because their regenerative root system sprouts after fire (low-high fire severity). Post-fire sprouting is common for mature leafy spurge, and leafy spurge abundance can be greater on burned than unburned sites. Fire's effect on leafy spurge seeds and seedlings is more variable. Reduced leafy spurge seed germination was reported after a spring fire in western North Dakota's Little Missouri National Grassland (Hull-Sieg, C. 1994). On 2 sites in east-central North Dakota, however, leafy spurge seedling density was high following spring prescribed fires. Survival beyond the seedling stage was not reported, but researchers suggested that fire could be useful in seed bank depletion (Gucker, Corey L. 2010).

Leafy spurge infested about 100 acres of the Bitterroot National Forest before the fires in 2000. An active integrated management program using herbicides and biological agents is successfully reducing spread and controlling new satellite infestations. Because leafy spurge spreads rapidly and is difficult to manage, it is a high priority invasive plant on the Bitterroot National Forest (Table 3).

St. John's Wort (Hypericum perfoliatum)

Appoximately 750 acres of the Bitterroot National Forest were infested with St. John's wort prior to the 2000 fires (USDA FS 1995b). Populations are scattered throughout the forest and appear to have no particular affinity to a specific vegetative cover type. It is found on rangeland areas, poorly managed pastures, fields, roadsides, forest clearings, and burned areas. This species spreads by seed and short runners. One plant can produce 15,000 to 30,000 seeds, causing a rapid spread once it is established. The seeds have a gelatinous coating, which enables them to stick to animals, clothing, or vehicles.

Biological controls have had great success in other states. The leaf-feeding beetle *Chrysolina quadrigemina* is a great species for control. It must be released with the correct moisture standards and if the population decreases dramatically it must be reintroduced. Another management method is improving the soil by scarification and fertilization and revegetating with native plants, which can reduce or eliminate St. John's wort. Mowing or grazing in not recommended, though it decreases seed spread, because it increases rhizome growth.

Oxeye Daisy (Leucanthemum vulgare)

Oxeye daisy infests more than 1,000 acres on the Forest, with most infestations occurring along roadsides and trails. Moist sites such as mountain meadows and riparian areas are most susceptible to invasion by this plant. Oxeye daisy is becoming more common throughout the Forest (USDA Forest Service 2003a). Livestock avoid grazing on this plant and it appears to affect the milk in livestock that consumeit. Oxeye daisy spreads by seed and vegetative plant parts. The Bitterroot National Forest uses picloram to eradicate this invasive plant.

Tall buttercup (Ranunculus acris)

Tall buttercup infests about 68 acres of the Bitterroot National Forest. Sites most susceptible to invasion include sub-irrigated and wet meadows, and riparian zones.

3.7.4 DESIRED CONDITION

The Bitterroot National Forest Plan direction on invasive plant management states:

- Control noxious weeds to protect resource values and minimize adverse effects on adjacent private land.
- Complete an evaluation of the risk of spread of noxious weeds in vegetative communities and implement control strategies.
- Develop noxious weed control strategies.

3.7.5 ENVIRONMENTAL CONSEQUENCES

A. Methodology

The forest botanist , biological science and range technicians, and noxious weed treatment contractors have conducted both general and intensive surveys in the project area surveyed invasive plants in the project area spanning the period from 2003 through 2014. The surveys focused on plants listed on the most current Montana State invasive plants list. Invasive plant sites found within the project area were documented, mapped and entered into the TERRA INVASIVES database.

3.7.6 INCOMPLETE AND UNAVAILABLE INFORMATION

Previous activities (timber harvest, road construction and maintenance, recreation, land development, agriculture, grazing, etc.) most likely contributed to the establishment and spread of invasive plants. Since the establishment of invasive plants is unknown and cannot be inferred from existing records, all infestations have been integrated into the existing condition.

3.7.7 SPATIAL CONTEXT AND TIMEFRAME FOR EFFECTS ANALYSIS

The spatial bounds of the invasive plants analysis are based on the project's influence on the risk of invasive plant introduction, spread, and establishment in the project area. Because ground disturbance increases these risks, the analysis area includes all treatment units and road systems associated with proposed project activities.

The analysis timeframe spans the existing condition, effects of the project during implementation, and longer-term effects after project activities cease. The existing condition of invasive plants in the Darby Lumber Lands project area is the culmination of past activities that favored their introduction, spread, and establishment. The analysis timeframe accounts for the cumulative effects of all actions up to the present, and the short-term and long-term effects of project implementation.

3.7.8 CONNECTED ACTIONS, PAST, PRESENT, AND FORESEEABLE ACTIVITIES RELEVANT TO CUMULATIVE EFFECTS ANALYSIS

Past ground-disturbing activities such as timber harvest, road construction, road maintenance, and trail development have contributed to the spread of invasive plants in the area. Recreational and economic land uses (hunting, hiking, fishing, logging, firewood gathering, off-road driving, and horseback riding) have also contributed to the spread of invasive plants, since forest users, their animals, and their vehicles can be

vectors for invasive seed spread. Wildlife movements also transport invasive plant seeds across the landscape. These activities are likely to continue.

Bitterroot National Forest data and data from other agencies, organizations, and communities in Ravalli County show that invasive plants occur throughout the county. Inventory knowledge and documentation of new populations and the status of known infestations are continually updated in order to fill in the existing knowledge gaps as funding allows. However, the data on invasive species for Ravalli County, the Bitterroot National Forest and non-federal land in the project area remains incomplete. As a result, the Forest assumes that:

1. there is a source of invasive plants on adjacent non-federal lands that can spread to federal lands, especially when differing land ownership can lie adjacent to each other, as within some watersheds; and
2. conversely, the invasive plants have the potential to spread from the Bitterroot National Forest to adjacent non-federal lands on which invasive plants may not be established.

Under either assumption, the risk of invasive plant spread from the federal lands to adjoining non-federal lands and *vice versa* needs to be reduced. Invasive plant seeds are spread by the wind, water, animal and avian vectors, and human activities. Additional human disturbance and traffic in the project area would increase the potential for spreading invasive plants. Thus, while the Bitterroot National Forest cannot stop the spread of invasive plants to and from non-federal lands, it can implement actions to reduce the risk or rate of spread and control of known populations.

3.7.9 ALTERNATIVE A – NO ACTION

A. Direct Effects

Alternative A would not change the current rate or risk of introduction, spread, or establishment of invasive plants in the Darby Lumber Lands Project Area.

B. Indirect Effects

Under the No Action Alternative, invasive plants would continue to spread at a low to moderate rate as natural disturbances, such as insects, disease, wind throw, and fire, create openings and areas of soil disturbance. Wind or wildlife, livestock, humans, or off-road vehicles travel would continue to spread invasive plants by transporting invasive plant seed into open areas (Zouhar 2001a). It is likely that invasive plants will spread onto bare or disturbed soil areas created by natural disturbances such as fire or soil erosion that are adjacent to invasive plant-infested sites. Spotted knapweed, in particular, has an affinity for open areas on dry aspects and can invade these openings without soil disturbance as long as a seed source is available nearby (Zouhar 2001a).

C. Cumulative Effects

Since there would be no direct or indirect effects from Forest Service actions that could contribute to invasive plants introduction or spread, there would be no cumulative effects from this project. Ongoing actions such as annual road maintenance and open road access for vehicles used by the general public would sustain the potential to increase the probability of establishment and spread of invasive plants. All infestations within the project area are eligible for treatment under the 2003 Bitterroot National Forest Noxious Weed Treatment Project Environmental Impact Statement and Record of Decision.

D. Summary of Effects

Because the No Action alternative proposes no ground disturbance, the risk of introduction, spread, establishment, and persistence of invasive plants in the project area would remain at current levels.

3.7.10 ALTERNATIVE B – FINAL PROPOSED ACTION

A. Design Features and Mitigation Measures

Reduce the risk of weed spread and establishment:

- Integrate weed prevention and management as outlined in FSM 2900
- Remove all mud, dirt, and plant parts from all equipment before moving into the project area. Cleaning must occur off National Forest lands (this does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area).
- All gravel and borrow sources would be inspected and approved, by the Forest Noxious Weed Coordinator/Forest Botanist, before use and transport. The source will not be used if invasive plants present at the pit are not found at the site of intended use. If invasive plants are present, they must be treated before transport and use.
- Regularly inspect, remove, and properly dispose of invasive plant parts and seed found on clothing and equipment.
- Revegetate with native plant species all project sites experiencing soil disturbance actions such as culvert removal, road decommissioning, natural recontouring, etc.

Herbicide use:

- Mixing and loading of tanks will occur more than 300 feet from live water where possible. No mixing will occur within 100 feet of live water.
- Use of herbicides and surfactants will adhere to mitigation measures and design criteria in the Bitterroot National Forest Weed EIS (2003) O:\NFS\Bitterroot\Program\2900InvasiveSpecies\InvasivePlants\nepa\2003- FEIS, or updates to the document.

3.7.11 DIRECT EFFECTS AND INDIRECT EFFECTS OF ALTERNATIVE B

Noxious weeds have been slowly encroaching into open areas throughout the Darby Lumber Lands Project Area, particularly along roadsides and other disturbed areas. Most of the invasive plant infestations within the project area occur in old roadbeds, active road corridors and areas that burned in the Fires of 2000.

Soil disturbance indirectly affects invasive plant establishment s by providing suitable habitat. Drifting seed establishes easier on prepared soil than on intact soil. All soil disturbances, where vegetation is removed, creates a suitable substrate for seed germination. However, if small areas (.01 acre or less) of soil disturbance are surrounded by native vegetation, the native vegetation is likely to revegetate the area.

Revegetation through seeding and stock planting of certified noxious weed-free native plant species approved by the Forest Botanist would also occur under Alternative B.

Design features of the alternatives would minimize impacts that invasive plants would have from any action that may occur from this project. Given unpredictable vectors for invasive plants spread, such as vehicle usage by the general public, wildlife, water, and wind currents, it is not possible to quantify with any degree of confidence the rate of weed spread in the future, or even the degree by which that potential would be increased by the proposed action. However, the proposed action, inclusive of design features, would minimize the spread of invasive plants. Treatments would reduce existing invasive plants populations from

spreading. Pre-implementation and post-implementation treatments of current and new invasive plant populations will occur within the project area.

A. Roads and Trails

Decommissioned Roads: Decommissioning of roads will reduce the risk of introduction and spread of invasive plant species by vehicle vectors. Simultaneously, however, physically closing roads and eliminating vehicle access will increase the difficulty of detecting the establishment of new invaders, monitoring the spread of existing invaders and treating any target invasive plants along the decommissioned road corridor. Adequate revegetation of decommissioned roads, a standard and successful practice on the Forest, will reduce the risk of establishment and spread of all target invasive plants in the long run.

Stored Roads: Storing roads will reduce the risk of introduction and spread of invasive plants by eliminating vehicle vectors. Some access for motorized/mechanized monitoring and treatment on a specifically authorized basis may remain for some forms of motorized/mechanized equipment on closed but drivable roads. In most cases though, monitoring and treatment would occur on foot or using stock.

New Construction Roads and Trails: Newly placed roads and trails will increase the risk of introduction and establishment of invasive plants in the short term by creating new soil disturbance areas. However, the new travel routes will allow easy access for monitoring and treatment of new and existing target invaders using standard mechanized/motorized equipment.

Adequate revegetation on cut and fill slopes of new travel routes roads along with continued routine monitoring and treatment, will reduce the risk of establishment and spread of all target invasive plants in the long run.

Drainage Improvement and Road Stabilization Actions: Soil disturbance associated with these actions will increase the opportunity for invasive plant establishment and spread on small sites in the short term. Adequate revegetation of the disturbed areas, along with continued routine monitoring and treatment, will reduce the risk of establishment and spread of all target invasive plants in the long term.

3.7.12 CUMULATIVE EFFECTS

Past, present, and reasonably foreseeable actions on National Forest in the project area that have affected or would affect invasive plants include timber harvesting, wildland fires and fire suppression, road construction, road maintenance and closures, recreation (fishing, hunting, snowmobiling, etc.), forest products gathering, and invasive plants control. Past management activities and activities on private land have increased the invasive plant populations in the Darby Lumber Lands Project Area.

The earliest activities considered in this analysis occurred in the late 1800s (excluding wildland fires) and, until recently, past activities incorporated few or no actions to prevent the introduction and spread of invasive plants. In general, past, present, and reasonably foreseeable activities with the greatest amount of ground disturbance, accompanied by a vector source of invasive plant seeds, had and have the greatest risk of invasive plant introduction, spread, establishment, and persistence. Invasive plants impact plant communities, especially in wetlands, riparian areas, and along roadsides in the project area. Foreseeable activities in the project area are expected to be similar to past and current activities: motor vehicle traffic, recreations use, and road maintenance. These activities would cause new site disturbance s that would be available for invasive plant colonization by existing s populations or new invasive plant species. The Forest Service is working to increase communication and treatment opportunities with other landowners, agencies, and organizations through the cooperation with the Ravalli County Noxious Weed District. These coordinated programs increase the treatment effectiveness and results in a cumulative decrease in the spread of invasive plants. Through multiple agency and private landowner cooperation, many invasive

plant populations, have been located and treated on federal and adjacent non-federal lands. This communication has also increased the educational outreach to land owners about the importance in treating and managing invasive plants, hopefully reducing the overall spread of invasive plants throughout the watershed.

Controlling the spread of invasive plants into the Darby Lumber Lands Project Area will continue with periodic herbicide treatments of roads authorized in the 2003 Noxious Weed Treatment Project Record of Decision invasive plants (USDA Forest Service 2003a).

3.7.13 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Both alternatives would be consistent with Forest Plan goals to "control invasive plants, to protect resource values, and minimize adverse effects on adjacent private land". Design features and timber contract specifications require all machinery to be cleaned prior to entering the project area. All ground-disturbing activities are required to follow certain invasive plants prevention methods as outlined in FSM 2900.

3.8 Soils

Soils within the analysis area have been mapped and are described in the Bitterroot National Forest Soil Survey. This information is available on the NRCS Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm. This inventory, which meets the standards of the National Cooperative Soil Survey, describes soil map units, landforms, and vegetation components, and provides interpretive information on soil use and management.

Soils in this area are mostly of granitic origin with some inclusions of sedimentary belt rocks. Most of it is highly weathered, coarse textured and erodible. Where there is a potential for sediment delivery, such as water crossings on roads, areas of bare soil increase the erosion risk. The roads in the analysis area provide a compacted surface that limit infiltration, vegetation growth and provide an environment ripe for weed infestations.

3.8.1 Scope of Analysis and Analysis Methods

This soils analysis focuses on current conditions of soil resources and the effects of:

- road decommissioning;
- road storage;
- skid trail/jammer trail rehabilitation; and
- new motorized route construction.

A. Road Decommissioning

Decommissioning of forest routes is proposed for routes that pose risks to resources and those that are no longer needed for forest management or recreation. Decommissioned routes are removed from the forest transportation system and are returned to the productive land base. **Road decommissioning is proposed on approximately 66 miles.** These road prisms will be converted back to the productive land base through obliteration activities and natural recovery in some cases. The restoration of these decommissioned roads will result in a long-term improvement in net soil productivity for the project area.

B. Road Storage

Routes that provide access for future management but are not needed presently are proposed to be stored (routes will remain on the forest transportation system and will be closed and hydrologically stabilized until needed for future use). **Road storage is proposed on approximately 55 miles**. Stored roads remain on the forest transportation system so that they are available for future use but watershed conditions are improved through treatments that hydrologically stabilize water crossings and the surface of road prisms.

C. Skid Trail/Jammer Trail Rehabilitation

Heavily used skid trails in former Darby Lumber Company sections 1 and 3 still have high levels of soil compaction and have limited soil recovery since harvest operations in the 1980's. **Subsoiling is proposed on 2.85 miles of skid and jammer trails** in sections 1 and 3. The subsoiling will alleviate compaction and speed the processes to allow natural recovery of the soils to occur more rapidly.

D. Development of New Motorized Routes

New proposed motorized routes are proposed to connect several forest system roads and enhance OHV recreation opportunities. **The project proposes to create 5.3 miles of new motorized routes.** Construction of new motorized routes will lead to loss of soil productivity on the immediate surface of the new route. The analysis area for the new route development includes the acres of soil productivity lost to route construction (based on 5 foot wide route surface for OHV and single track trails and 20 foot wide for full size vehicle). Approximately 2 miles of OHV trails and 2.8 miles of single track trails are proposed. One new full-size vehicle road segment will be created to provide access around the Crystal Mine property on FSR 715 to FSR 75. This new full size vehicle route will be approximately 0.4 mile.

3.8.2 REGULATORY FRAMEWORK

The National Forest Roads and Trails Act of 1964 authorized the Forest Service to establish and maintain a network of roads and trails on National Forest System lands. Implicit in this legal direction is Forest Service authority to withdraw lands from vegetation production and related soil productivity on National Forests for dedication to road and trail corridors for transportation and access uses. In this context, impacts to soil productivity resulting directly from the presence of roads and trails are not evaluated for compliance with Region 1 Soil Quality Standards (R1 SQS), because the affected land is managed for transportation uses rather than vegetation production. Therefore, analyses of soil resources provide background information for better understanding of watershed impacts from roads and trails on the Bitterroot National Forest.

Executive Orders 11644 (1972) and 11989 (1977) both address OHV use on public lands. The orders establish direction for the management of OHV use and provide for closing areas to OHVs where resources would, or are, being negatively impacted.

General guidance on management of soil resources is included in the Bitterroot National Forest Plan and the R1 SQS (PF-SOILS-001).

3.8.3 AFFECTED ENVIRONMENT

A. Soil Productivity and Forest Routes

The Darby Lumber Lands project area currently has 264 miles of forest system roads. Soil productivity was lost on the immediate routes when these roads were initially constructed. Assuming an average road footprint of 20 feet in width, approximately 640 acres have been removed from the productive land base as

part of the forest transportation system in the project area. Based on this analysis, the existing Transportation System in the Darby Lumber Lands project area occupies approximately 0.04 percent (.0004) of the Bitterroot National Forest's land base.

Forest roads and trails affect soil productivity by removing and displacing top-soil during initial construction, compacting subsoils, changing microclimate, and accelerating erosion. Losses of soil productivity associated with road-caused accelerated erosion are site-specific, and highly variable in extent (Gucinski et al. 2001). Poor road or trail drainage can cause runoff to pond on route surfaces. This ponding, in combination with both non-motorized and motorized use, can degrade route surfaces over time and lead to increased erosion. Poor drainage can accelerate flow of water on route surfaces which can lead to rutting and transport of sediments off of road surfaces.

Soil impacts tend to be more severe at high elevations on steep slopes, and on wet, poorly drained soils. Erosion resulting from soil compaction, and other adverse impacts such as trail widening or multiple trails due to off-road vehicles, is generally greater in wetter soils, especially if subjected to heavy use.

Coarse textured soils erode readily when exposed to flowing water, and are susceptible to degradation from wheel churn on motorized vehicles. Unauthorized trails on these soils that were not properly constructed may form rutting and widen over time, especially on slopes. Rutting on hill slopes channelizes water which further increase erosion and losses of soil productivity. Typically when these erosive routes are identified on the Forest they are closed to access (PF- SOILS-002). There have been cases where trails were improved and maintained or were re-routed around erosive soils and slopes to provide access to a desired location.

Maintenance is necessary to ensure the integrity of travel routes. Maintenance of roads consists of blading surfaces and ensuring drainages are clear of obstruction. Trail maintenance consists of clearing the route of obstructions and implementing measures such as water bars to minimize erosion. Maintenance of travel routes is based mostly on Forest Service funding and support from partners. In areas where degraded road or trail conditions are not addressed, continued loss of soil productivity could occur due to erosion and rerouting of trails by users.

B. Watershed Implications

Management activities associated with roads, trails, and cross-country motor vehicle use can accelerate erosion and sediment beyond the historic range of variation and geological rate (Satterlund and Adams 1992). Erosion can also be increased for short durations by natural disturbance events. Accelerated erosion and sediment delivery from trails follow the same processes that occur from roads. The primary source of erosion and sediment is the trail itself, with accelerated erosion occurring once vegetative cover is lost. The extent of erosion is primarily determined by trail location and complex interaction between topographic, soil, and geomorphic features (Wilson and Seney 1994).

Erosion will also increase based on the use that occurs on a route. Hiker, horse, and wheeled-vehicle use all increase erosion depending on the location, amount of use, and type of use. Erosion increases with compaction, particle detachment, and channelization. Weaver and Dale (1978) found that horses caused greater increases in soil compaction, litter, trail width, and depth compared to hikers and motorcycles. Studies in Montana have shown that horses and hikers make more sediment available due to detachment than motorcycles and off-road bicycles (Wilson and Seney 1994). Meyer (2002) has documented that wheeled vehicles will increase erosion from compaction, surface subsidence, and wheel shearing and pumping.

Geomorphic effects of roads range from chronic and long-term contributions of fine sediment into streams to catastrophic mass failures of road cuts and fills during large storms (Gucinski et al. 2001). Roads affect

geomorphic processes by four primary mechanisms: accelerating erosion from the road surface and prism itself by both mass and surface erosion processes, directly affecting channel structure and geometry, altering surface flow paths, and causing interactions among water, sediment, and woody debris at engineered road-stream crossings (Gucinski et al. 2001). Road-related mass failure results from various causes.

Landtype plays a major role in the erodibility of the soils. Landtypes are a fine scale unit of a hierarchical ecological framework. Landtypes represent geology, soils, geomorphology, vegetation, and many other ecological data depending on mapping intensity. Soil and landtype mapping information is included in the Bitterroot National Forest Soil Survey (NRCS MT647). This information can be accessed on the NRCS Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

Motorized routes are typically not constructed to exceed 20 percent gradient. Minimizing trail gradient steepness greatly reduces the potential for erosion. Best Management Practices (BMPs) are often implemented to minimize runoff on the surface of a route. Diversions, waterbars, cross drains, culverts, hardening of the surface, and out sloping are a few examples of BMPs that are installed on routes to slow water flow and reduce the distance it travels on a route surface. The longer the distance and the faster water flows across the surface of a route, the more erosion occurs regardless of soil type.

3.8.4 Environmental Consequences

A. Direct and Indirect Effects

Direct and indirect effects analysis for soil productivity focuses on the following indicators:

- miles/acres of road decommissioned and stored; and
- miles of road stored
- miles/acres of skid trails/jammer trails decompacted; and
- miles/acres of new motorized route construction.

B. Road Decommissioning

Roads analysis for the project has identified roads that pose risk to resources and are no longer needed for forest management. Decommissioning of these roads will minimize and in most cases eliminate risks to other resources. In terms of soils, road decommissioning returns these rehabilitated areas back to the productive land base, resulting in an improvement in soil productivity for the project area. In time, soils previously disturbed by road infrastructure will naturally recovered to the surrounding forested habitat types. Decommissioning will involve decompaction of the road surface, partial to full recontouring of the road prism, mulching, fertilizing, and seeding. Establishment of vegetation will be monitored the following growing season. Areas with poor establishment will be reseeded to achieve successful recovery of vegetation.

Table 3.8- 1: Road Decommissioning

Alternative	Road Decommissioning (miles)	Soil Productivity Improvement (acres)
Alt 1	0	0
Alt 2	66	330

C. Road Storage

Road storage also improves watershed conditions but does not return the road back to the productive land base. Road storage treatments hydrologically stabilize a road until the road is needed for future management. Storage treatments often involve scarification of the road surface and seeding and fertilizing treatments to establish vegetation to minimize potential erosion. Surrounding forest vegetation may grow in on the road surface over time, which further stabilizes the road from erosion and provides a temporary improvement in soil productivity until the road is re-opened for future management.

Table 3.8- 2: Road Storage

Alternative	Road Storage (miles)	Watershed Hydrologically Stabilized (acres)
Alt 1	0	0
Alt 2	55	275

D. Skid Trail/Jammer Trail Rehabilitation

Roads analysis for the project has identified roads that pose risk to resources and are no longer needed for forest management. Decommissioning of these roads will minimize and in most cases eliminate risks to other resources. In terms of soils, road decommissioning returns these rehabilitated areas back to the productive land base, resulting in an improvement in soil productivity for the project area. In time, soils previously disturbed by road infrastructure will naturally recovered to the surrounding forested habitat types. Decommissioning will involve decompaction of the road surface, partial to full recontour of the road prism, mulching, fertilizing, and seeding. Establishment of vegetation will be monitored the following growing season. Areas with poor establishment will be reseeded to achieve successful recovery of vegetation.

Table 3.8- 3: Road Decommissioning

Alternative	Skid Trails/Jammer Trails (miles)	Soil Productivity Improvement (acres)
Alt 1	0	0
Alt 2	3	15

E. Construction of Motorized Routes

New motorized routes have been proposed to improve full size vehicle access (access on FSR 715 around the Crystal Mine property to FSR 75) and enhance OHV and single track recreation by creating loop routes and improving trail connections. Table 3.8.4 compares the miles of motorized routes that require new construction. Acres of soil productivity lost due to full size route construction has been estimated based upon a 20 foot wide prism. Loss of soil productivity for OHV and single track routes is estimated based upon a 5 foot wide prism.

Table 3.8- 4: Motorized Route Construction

Alternative		New Motorized Route Construction (miles)	Loss of Soil Productivity (acres)
Alt 1		0	0
Alt 2	Full size vehicle route	0.4	1
	OHV route	2	1.2
	Single Track route	2.8	1.7

Overall, minimal new construction is proposed in Alternative B. Loss of soil productivity from new construction would be negligible in comparison to the amount of roads decommissioned and returned back to the productive land base **(3.9 acres loss of soil productivity on new routes verses 330 acres returned to productive soils from road decommissioning)**. New construction would increase the Transportation System in the project area by less than 0.04 percent.

Summary

Overall, minimal new construction is proposed in Alternative B. Loss of soil productivity from new construction would be negligible in comparison to the amount of roads decommissioned and returned back to the productive land base **(3.9 acres loss of soil productivity on new routes verses 330 acres returned to productive soils from road decommissioning)**. Alternative B will also hydrologically stabilize 55 miles of road and alleviate compacted soils on approximately 15 acres of compacted skid/jammer trails.

3.8.5 CUMULATIVE EFFECTS

For the soil resource, the main areas of consideration within the watersheds are the roads proposed for active rehabilitation treatments and new route construction since effects to soils are site specific. Soil erosion is an exception. Soil erosion is discussed in the watershed resource section.

A. Alternative A (No Action)

With no active rehabilitation treatments, there would be no direct or indirect effects, and therefore no measurable cumulative effects to soils are expected.

B. Alternative B

The active road storage and decommissioning treatments will cumulatively improve soil productivity in the Upper Sleeping Child and Rye Creek watersheds. Road decommissioning will return 66 miles of road (330 acres) back into the productive land base. The decommissioning will re-establish hydrologic flow and rooting potential for vegetation. Decommissioning would involve seeding and fertilizing to help improve plant establishment. Most importantly, the treatments would inhibit access and eliminate further disturbances to these areas which would also speed along natural recovery processes. Road storage will hydrologically stabilize 55 miles of road. Hydrologically stabilizing these roads will minimize erosion and deposition that can reduce soil productivity in areas adjacent to roads. Soil decompaction treatments on 15 acres of skid/jammer trails will also improve soil productivity by eliminating root restrictive layers, allowing water infiltration and rooting depth to extend deeper into the soil profile.

New route construction will lead to a loss in soil productivity on 4.8 acres in Alternative B. However, with this soil productivity loss there will cumulatively be a net improvement in soil productivity of 326 acres due to the amount of road decommissioning returning roads back to the productive land base.

3.8.6 CONSISTENCY WITH THE FOREST PLAN, LAWS, AND REGULATIONS

A. Bitterroot National Forest Plan

Consistency with the Bitterroot National Forest Plan forest-wide resource and management area standards applicable to the soil resource would be accomplished the following ways. The Bitterroot National Forest Plan does not have numeric soil quality standards.

B. Forest-wide Management Standards

- Soil and Water Conservation Practices will be a part of project design and implementation to ensure soil and water resource protection (USDA Forest Service 1987a, II-25).

How addressed: Region 1 Soil and Water Conservation Practices applicable to travel management planning in section 2.7 Project Design Features, Mitigation and Monitoring.

- Plan and conduct land management activities so that reductions of soil productivity potentially caused by detrimental compaction, displacement, puddling, and severe burning are minimized (USDA Forest Service 1987a, II-25).

How addressed: A Soil Scientist field reviewed existing site conditions on system routes and unauthorized trails with potential soil concerns. Utilizing this data, the Soil Scientist was able to determine necessary closures or modifications of routes to protect soil productivity.

- Plan and conduct land management activities so that soil loss, accelerated surface erosion, and mass wasting, caused by these activities, will not result in an unacceptable reduction in soil productivity and water quality (USDA Forest Service 1987a, II-25).

How addressed: See above discussion under Page II-25(7).

- Design or modify all management practices as necessary to protect land productivity and maintain land stability (USDA Forest Service 1987a, II-25).

How addressed: See above discussion under Page II-25(7).

C. Management Area Standards

Management Areas 1, 2, 3a, 5, and 8a (USDA Forest Service 1987a, III-6, 12, 18, and 59).

- Provide soils technical support for management activities on sensitive soils

How addressed: A Soil Scientist participated on the Travel Management Planning Project ID Team (FEIS Appendix D – List of Preparers), and will participate in the implementation as needed.

All alternatives would be in compliance with applicable forest-wide and management area Forest Plan standards for soils.

Executive Order 11644 (1972) and 11989 (1977)

These orders address OHV use on public lands. The orders establish direction for the management of OHV use, and provide for closing areas to OHVs where resources would, or are, being negatively impacted.

How addressed: The Bitterroot National Forest is engaged in an active watershed improvement program that includes restricting access and rehabilitating motorized access trails where excessive soil productivity is

lost and erosion occurs. Motorized access routes that threaten water, fisheries, wildlife, and botany resources are also commonly closed to prevent further impacts to resources (PF- SOILS-002).

Region 1 Soil Quality Standards (R1 SQS)

Soils standards were developed to meet direction in the National Forest Management Act of 1976 and other legal mandates. To manage National Forest System lands under ecosystem management principles without permanent impairment of land productivity and to maintain or improve soil quality.

How addressed: Soil quality standards apply to lands where vegetation and water resource management are the principal objectives, that is, timber harvest, grazing pastures or allotments, wildlife habitat, and riparian areas. The standards do not apply to intensively-developed sites such as mines, developed recreation sites, administrative sites, or rock quarries. They are not intended to prohibit other resource management practices such as installing waterbars or preparing sites for planting, as long as such practices are consistent with long-term sustainability of the soil resource. Permanent roads do affect soil-hydrologic function, however, their evaluation is more appropriately done on a watershed basis using models and other watershed analysis techniques.

3.10 ECONOMICS AND SOCIAL ASPECTS

The public and local officials have expressed concern that the Darby Lumber Lands project could have negative economic or social effects. Proposed activities within the project area may have the potential to impact the economic conditions of the communities in Ravalli County. Although specific vendors or businesses in adjoining counties may also see effects, the preliminary review of the project suggests the proposed changes, and the related economic effects, would be limited. For this reason, Ravalli County was chosen as the spatial boundary for economic and social effects discussion.

This section uses the proposed access changes as an indicator for economic effects. It provides a brief comparison between the existing and proposed transportation systems (including trails), and the potential for the travel management aspect of the decision to affect the economic and social structure of Ravalli County. It also provides a discussion of other potential economic activity resulting from the decision.

3.10.1 BACKGROUND AND POTENTIAL FOR EFFECTS

The Darby Lumber Lands project focuses on a small area of the Forest (less than 2 percent of the total BNF area) and initial comparison of the alternatives suggests that the changes resulting from the decision, and the associated effects to the economy and social structure of the county would be negligible. To test this general impression, changes in non-motorized and motorized access resulting from Alternative B were compared to the Existing Condition to determine if a detailed economic and social analysis was warranted. This method assumes the potential for economic and social effects are directly related to the amount of access change proposed. Since the project area represents only a small part of the recreational motorized recreation occurring on the BNF, and the economic benefit related to it, the potential changes in motorized access (and therefore related motorized and non-motorized recreation) from this project are compared to motorized and non-motorized access for the entire BNF. This is appropriate as access, and related activities, on the entire BNF affect the economies of the county and its communities.

Table 2.1 (Comparison of Alternatives) displays several simple motorized access characteristics associated with the two alternatives; Alternative A (No-Action) and Alternative B (Final Proposed Action). Table 3.10.1 displays the absolute and percentage changes in several road access categories when compared to the same categories for the entire BNF. Mileages are not exact but represent the current inventory and designations.

Table 3.10- 1: Changes in Access as an Indicator of Economic Effects

Route Category	Increase (Decrease) with Alt B (miles)	BNF Existing Condition (miles)	Percent Increase (Decrease) from BNF Existing Condition
Seasonally restricted roads (all R-codes except Open and R-1)	No Change	762	0
Unrestricted roads (roads designated "Open")	(9.7)	887	(<1)
Motorized Trails (OHV < 60")	2	660	<1
Non-motorized Trails	No Change, none in project area	NA	NA

3.10.2 DISCUSSION

A. Effects to the County's Economy

Results in Table 3.10-1 suggest the proposed project would implement extremely small changes in either motorized or non-motorized access when compared to the entire Forest. Given the diverse nature of the economy in Ravalli County, it is difficult to interpret these small changes in access as drivers of economic change, for better or for worse. While the changes in the project area transportation system allow for motorized access to several newly acquired sections of land, there are no unique or unusual features, or recreational destinations, that are made accessible by the changes associated with Alternative B.

Non-motorized recreation is likely to see only minor impacts from implementing Alternative B. This alternative does not convert any currently non-motorized trails to motorized status, although several currently closed roads would be open seasonally as routes for OHVs < 50" in width; non-motorized recreationists who have been using these routes may be displaced or feel their experiences are affected by motorized use. Since all newly opened routes restrict motorized use during big-game rifle season and a large network of seasonally-closed roads still exists, walk-in hunting opportunities will still be widely available. Hunters may see a specific closed road treated and be made less walkable, but many options will still be available.

Only one single-track trail would see its motorized status affected with Alternative B. Trail 104 would be connected from its current terminus in Section 3, T3N, R19W to the old corral area at the top or south end of TR500 using historic trail and a segment of existing road, and a seasonal restriction for the entire trail would be implemented. Non-motorized use of this area is likely to be very light, given its proximity to a developed road system and history of forest management, neither of which are conditions sought after by those seeking non-motorized recreation. The rest of the single-track trails in the project area would maintain their current motorized access status, suggesting the non-motorized recreationist use associated with these trails, and therefore their economic contribution to the County, would not change from the current situation.

Overall, the Alternative B changes in travel management in the project area are extremely minor in the context of the Ranger District and the entire Forest. The changes would not add or eliminate access to special destinations or unique features within the project area or surrounding area. While the RCORUA has noted it will promote the use of the routes through their club contacts, the lack of special destinations and moderate additions to mileage suggest a modest increase in use at best. Overall, the minimal changes in motorized and non-motorized access within the area suggest the changes in contributions to Ravalli County's economy from the public using either type of access are likely to be negligible.

Alternative B would implement approximately 120 miles of road decommissioning and storage. The watershed and engineering staffs estimate about two-thirds of the proposed mileage would need ground-disturbing treatments. The ground-moving work is likely to be accomplished by both contracting and Forest Service staff. Contracted work of this type has run from $5,000 to $12,000 per mile, depending on location, terrain, road design, treatment goals, fuel cost, and other factors. This could result in $700,000 to $1,000,000 direct benefit to the local economy, and much more in indirect benefit. Local and regional contractors have lower mobilization costs, leading to favorable bids and the potential to be awarded a large portion of the work, which would provide direct and indirect economic benefits to the County for the project's duration (3-5 years). Alternative A treats no roads and therefore would not provide that economic effect. Since most of the roads proposed for treatment are already in a closed status, there is little loss of other economic activity associated with treating them. The proposed new construction (2 miles of connector trails for OHV <50" in width, 0.4 miles of specified road) is estimated at about $20,000 of mostly heavy equipment work, with some hand crew support. This work is likely to be accomplished by a mix of private contracting and Forest staff. Volunteer effort may lower this cost slightly. This expenditure would also benefit the local economy.

There have been questions on how much a restoration-only alternative would benefit the local economy. The discussion above suggests the differences between the proposed (final) Alternative B and a similar alternative that leaves out OHV-related construction would be small. Any additional restoration work would increase expenditure and related economic benefit for the duration of the implementation period.

The monetary costs of a deteriorating road system and high road density are difficult to calculate, but include the costs of associated impaired water quality, fisheries effects, water treatment costs to downstream communities, increased opportunity for invasive species introduction, and loss of certain resource-oriented business opportunities such as guiding and outfitting. Alternative B is likely to reduce certain environmental costs within the target watersheds, but on a Forest-wide basis, would have only minor effects due to the small portion treated.

B. Social Aspects

The minimal changes in motorized access in the project area are unlikely to cause more than minor effects in the social aspects of using the project area or forest. The increases in seasonably-restricted routes related to new trail construction and opening of existing roads to OHVs < 50" in width, and the construction of the Crystal Mine bypass on FR715 would increase motorized access in those areas. Most of these changes occur in areas that are not attractive to non-motorized users (timber emphasis areas with high density road networks) and few user conflicts are likely. During the busiest time of year (big-game rifle hunting season), motorized use on these new trails would be restricted, reducing the potential for user conflict during that season. Also, motorized use will be better controlled after road storage and decommissioning treatments, which make those routes impassible for motorized traffic. Please see the Recreation and Trails section for more discussion on recreational experience and the effects of both alternatives.

C. Internal Costs

This project was initiated due to aquatic resource concerns rather than road maintenance costs. Road location and road design of many of the miles of road within the project area were by a private land owner to access timber without regard to the surrounding transportation systems. In some of these sections the transportation system is located solely within the 1 square mile of ground that was owned by the private timber company. In the event the Bitterroot National Forest was designing the transportation system in these areas, the design would have been much different. In these areas where the road locations and designs are not connected to the surrounding roads system, decommissioning poorly located roads, along with considering re-design and new construction at a future date makes more sense than being tied to a transportation system that is degrading aquatic resources, knowing future timber management is decades away.

Both Sleeping Child and Rye Creeks are MDEQ-listed as water-quality impaired on the Bitterroot National Forest. Past road building and timber activities on public and private land have created chronic sediment loading into Rye and upper Sleeping Child Creeks. Catastrophic wildfires in 2000 worsened the situation and caused substantial road system failures. There is currently direction from Congress to do rehabilitation projects in impaired watershed in order restore them to a functioning condition. The Darby Lumber Lands Watershed Improvement and Travel Management Project is an investment in the watershed and timber resource. The un-needed routes to be decommissioned will be returned to the productive land base, and will once again be capable of growing trees and supporting basic watershed "sponge and filter" processes.

Using a cost/benefit process, this project has identified the minimum transportation system needed to manage these National Forest System lands for the future. The interdisciplinary team included silvicultural and timber management foresters who took a critical look at what would be needed to manage the National Forest System Lands within the areas designated in the Forest Plan for timber emphasis. In the future, road construction to access certain sites within the project area may be implemented, but it will not be until there is sufficient volume of timber, or another pressing need to access this land.

All of the proposed activities (watershed improvement, trail building and aspen treatment) are highly likely to be financially supported by interested stakeholder groups, reducing costs to the taxpayer. Groups supporting these activities have already expressed interest in doing so during the project development and scoping periods.

Summary

The initial assessment of project activities suggests minor changes in access are not likely to drive economic effects, due to the multitude of recreational opportunities available within the BNF and Ravalli County. Social effects are likely to be similarly limited, although improvement in water quality and fisheries is likely. Increased access to newly acquired sections may interest local OHV users enough to visit the area, but since there are no unique destinations or experiences offered by implementing Alternative B, the economic and social effects are likely to be minor. The project proposes storing and decommissioning of roads that are for the most part, already closed, suggesting a potential positive economic effect for those activities. For these reasons, a more in-depth economic and financial analysis was not performed.

3.11 CUMULATIVE EFFECTS SUMMARY

Many activities take place within and around the project area. While the upper Rye and Sleeping Child watersheds and their surroundings are mostly public lands, the lower watersheds include private lands and activities of various types.

Public firewood gathering, hunting, motorized and non-motorized recreation that occurs on open roads in the area would continue with either alternative. There are no proposed Forest Service forest management

activities proposed in the project area and none currently being planned. Noxious weed management occurs on an annual basis and includes the use of approved herbicides.

Overall the project reduces road miles and open road miles, along with the associated cumulative road effects on water quality and wildlife. New OHV routes may increase motorized traffic on roads and trails within the project area as recreationists visit the newly opened routes, but the overall level of access, and motorized use is unlikely to change substantially.

3.12 Irreversible and Irretrievable Commitments

An irreversible commitment of resources refers to the use or commitment of resources that is incapable of being reversed or changed. Irretrievable commitment of resources refers to actions that result in changes to resources that cannot be recovered or regained.

The physical change in the landscape when roads are constructed is an irreversible loss in the aesthetic quality of the area and to some extent the hydrologic function of the watersheds. Under Alternative A, no change would occur and under Alternative B, not all road prisms would not be completely recontoured. There would be some road prism visible following decommissioning treatments across the project area. In addition, to some extent this would always have some affect on the hydrology of the area. No matter how thorough the decommissioning job is, the area would never be as it was prior to constructing the roads. Over the very long term Alternative B would reduce the time the roads are visible and would remove most of the detrimental effect the roads have on the hydrologic function of the watersheds.

Alternative A would result in an irretrievable loss of stream health. Since the streams are currently in a degraded condition, the stream themselves and the riparian habitat they support are not producing to their full potential. For instance, the fisheries produce only a fraction of the fish they could under pristine conditions. The number of fish that could have been produced if the stream were pristine is an irretrievable loss.

Access for logging may not be an irreversible loss since logging technology can compensate for the reduced road densities. As it relates to motorized access, decommissioning roads is not an irreversible commitment. Decommissioned and stored roads could be reconstructed if the need arises for future management. Such a decision would require analysis to determine effects and would not to meet various resource regulations and NEPA requirements.

Overall, this project is not precedence setting since road decommissioning is a common practice and implementation of this project would not change National Forest programs or policies. There are no future actions that would become imminent or necessary as a result of this decision.

Access to private land or improvements such as power lines are maintained.

3.13 IMPLEMENTATION SCHEDULE

Any activities chosen for implementation would occur as Forest Service and Partnership funding allows. At the time of writing this EA, funding for road decommissioning treatments is available through a partnership agreement if those activities are included in the decision. Road decommissioning treatment implementation would start in summer 2015 if all NEPA requirements are met and Alternative B is chosen. Full implementation of road treatments would likely take 3-5 years. At this time, the RCORUA OHV Club is waiting on a signed decision prior to applying for funds to help implement the connector trail construction and BMP upgrades for newly opened routes. These activities are more likely to occur the following year and would take several years to implement.

3.14 REQUIRED DISCLOSURES AND POTENTIAL CONFLICTS WITH PLANS AND POLICIES OF OTHER JURISDICTIONS

Implementation of Alternative A would not comply with the Lynx Conservation and Assessment Strategy (Chapter 3.5). The LCAS states…"Determine where high total road densities (> 2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas" (LCAS:7-10). Therefore, Alternative A would not be consistent with LCAS direction, whereas Alternative B is consistent.

Alternative A would maintain current road system effects on water quality, and would be inconsistent with Forest Service policy, the agreement with Montana on water quality standards attainment, and direction from the 2011 TMDL.

3.15 ENVIRONMENTAL JUSTICE

Executive order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, directs federal agencies to integrate environmental justice considerations into federal programs and activities. Environmental justice means that, to the greatest extent practicable and permitted by law, all populations are:

- provided the opportunity to comment before decisions are rendered on;
- allowed to share in the benefits of;
- not excluded from;
- not affected in the disproportionately high and adverse manner by;
- government programs and activities affecting human health or the environment (E.O. 12898 and Departmental Regulation 5600-2).

None of the alternatives would have a discernible effect on minorities, American Indians, or women, or the civil rights of any United States citizen. No alternative would have a disproportionate adverse impact on minorities or low-income individuals.

3.16 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF ALTERNATIVES

Alternative A would require no commitment of energy since no equipment would be used to implement any activity. Alternative B on the other hand would require the fuel used by the heavy equipment during the road treatment process plus the fuel used by vehicles traveling to a from the work site. Project implementation would use several hundred gallons of fuel. This amount is not a substantial or an unusual amount since projects throughout the Bitterroot valley consume this amount of fuel on a daily basis.

3.17 ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Under Alternative A (No-action) degradation of water quality would continue and is an unavoidable effect of the alternative as are losses in habitat for wildlife and the continued disruption of watershed hydrology. As stated in the Section 3.2 some sediment would enter the streams if Alternative B were implemented. This is expected to be short-term but could cause some localized adverse effects on water quality. This is especially true for the first few hours after stream crossings are treated. Roads provide access for fire suppression. While Alternative B would reduce access for fires, there are still high road densities remaining and many opportunities for fire suppression access.

4.0 LIST OF THOSE PERSONS CONDUCTING THIS ANALYSIS AND PERSONS AND AGENCIES CONTACTED.

4.1 PERSON CONDUCTING THIS ANALYSIS

- Ed Snook — ID Team Leader and Hydrologist
- Rob Brassfield — Bitterroot N. Zone Fisheries Biologist
- Dave Lockman — Bitterroot N. Zone Wildlife Biologist
- Cole Mayn — Bitterroot NF Soil Scientist
- Erin Nock — Bitterroot NF GIS Coordinator
- Mark Smith, Deb Gale — Bitterroot NF Trails Specialist
- Robin Taylor-Davenport — Bitterroot NF Botanist
- Gil Gale — Bitterroot NF Range and Invasives Lead
- Mary Williams — Bitterroot NF Historian
- Jacquie Parks — Bitterroot N. Zone Fuels Specialist

4.2 LIST OF PERSONS AND AGENCIES CONTACTED

AGENCIES:

- USDA Natural Resources Conservation Service
- US Fish and Wildlife Service
- US Environmental Protection Agency
- Montana Fish, Wildlife, and Parks
- Montana Department of Natural Resource Conservation
- Montana Department of Environmental Quality

TRIBES:

- Confederated Salish and Kootenai Tribes

OTHERS:

- Nancy Balance – Montana State Representative
- Pat Connell – Montana State Representative
- Ron Ehli – Montana State Representative
- Ed Greef – Montana State Representative
- Ravalli County Commissioners
- Scott Boulanger – Montana State Senator
- Fred Thomas – Montana State Senator

- Bitterroot Restoration Committee
- Ravalli County Off Road User Association (RCORUA)
- Friends of the Bitterroot